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INDUSTRIAL-ARTS MAGAZINE

Vol. V NOVEMBER, 1916 No. 11

PRACTICAL ART EDUCATION

Walter Barron Currier, Teacher of Arts and Crafts in Lincoln High School, Los Angeles, Cal.

EVERYTHING that is truly artistic is practical. In fact it is almost as practical as a steam engine. Sounds funny, doesn't it? But it is true for this very reason, that a beautiful, artistic creation if it is possessed of the elements of art will sell quicker, will be more appreciated when it is purchased, than a daub of inartistic imitation. Notice particularly the cheap but truly artistic bric-a-brac of the Japanese. There is scarcely anything made, however cheap, by this nation but what is artistic. When you are making a chair and want it to be practical, do you not find that the chair that is designed along the truly artistic principles and lines, is the most practical, and if you are making it to sell, doesn't the chair that is simple and spaced in good proportions make the most practical chair? Doesn't the room that is designed in true artistic proportions, regardless of what is placed in it, become the most beautiful room?

This is a side of art that I have pursued most diligently in all my courses at the school where I am teaching at present. We are doing some beautiful things as well as we know how. I find, too, that the most of us are looking first to the dollars and cents before we look at the artistic. I wish it weren't so, for when we think in dollars it is hard to become sensitive to beauty. Dollars are circular, and a circle is the most monotonous curve there is. However, one must take things as he finds them, and if you can gain the interest of the pupils by showing them a practical end in view then they will attack the problems with greater zeal. In a short time you have awakened the other finer sense, so that they will truly dislike the glaring and inartistic monstrosities we see on the billboards and Sunday supplements and enjoy, on the other hand, a refined harmony of color with the small spaces in the designs of bright colors and the large masses of more somber hues.

But here I am giving you a little theory. I have a poster class in design and lettering which is doing some very practical work and at the same time there is much of artistic worth. For instance, one of our first problems was to design a circus poster and in order to catch the public's eye we were to make some sort of pun or witty remark as a slogan that would be of advertising worth. At a zoo nearby we could get sketches and then come in and draw the animals from the sketches. Therein was developed the drawing side of it. The spacing of the problem in the given rectangle was next, therein the art principle of proportion. At the same time for home work every night, the whole class worked on a complete alphabet used by the Modern Art Society of New York, and similar to the one used on many of the broad German posters. This lettering is continued thruout the course so that as fast as one alphabet is mastered they take up another, so that by the end of the term the class has mastered at least six alphabets and has copied, for future reference, as many more. During the remaining out of school work, we have gathered together by tracing, as many good examples of book cover design (not pretty girls' heads), good arrangements of animals, birds, of oriental design, as we can. This tracing is one of the best developers of good drawing that one can do. It sounds like copying, but the students soon learn to choose what is good and what isn't good in that way, thereby developing judgment and appreciation. That is just what all of us need—appreciation to know what is artistic and what has the elements of art in it, and what has not. It is the very thing that Professor Dow of Columbia is developing and what we as a nation need.

Well, we worked this first poster out first in dark and light in three values, then traced it onto colored poster paper. In this problem and in the following two we copied color schemes from some color prints by Jules Guerrin, who, as we know, was the designer of all the color schemes in the Panama Pacific Exposition. This set them to thinking in good color, and at the same time showed them that a poster could be effective and possess more harmony than if we used the colors seen so often on the billboards, and cheaper magazine covers.

I do not lay so much stress upon drawing as most teachers do. Drawing is, of course, essential but it is something that will take care of itself in so short a time that if it is emphasized at first, the student loses all sense of the artistic and thinks of lines and drawing, which in a short time crushes out all the originality and spontaneity that he otherwise would

have. Drawing is the grammar of art, and we should learn to talk and express our original thought first rather than how to talk. We can take up grammar when we are older, and the more we talk, the sooner we will see that it is only carefulness that produces good drawing. That little spark of self-confidence and originality that can be so easily smothered is what every teacher should look out for, and develop. It is so valuable, and may be even greater than you as a teacher may be. Who knows but that the very pupil that you are teaching may awaken to be a great artist! Many people can draw, as we see when we look at the long lists of graduates from so many art schools, but it is that originality, that divine something, that makes the great artists. The originality is what is nearest to art if it adheres to the five art principles. Many bits of crudely worked out designs of the Indians, or the South Sea Islanders, the Maoris, are more redolent with true art than some of these awful things we see in the art galleries. Why! Because these aborigines express themselves, and what they feel, and because they live close to nature and don't see these awful Sunday crudities and painful actual drawings of fruit—"so natural that you could eat it," almost—they produce something beautiful and original. We are not trying to be savages just to be original, but we are trying to get at the fundamentals, and to look at the artistic things that are truly artistic so that we can produce advertisements that will be attractive, commercially available, and above all truly artistic. And it is just as easy as to make something glaring and inartistic. We find that the results take care of themselves, so much so that one of the boys does his lettering so well that he is working up a little business in writing show cards for a number of the people in business nearby. Of course the class makes all the posters for all of our dramatics, our school paper, and semi-annual publications. Besides our poster work we try to get a good knowledge and appreciation of book cover design, and a little illustration. As for lettering we use freehand brush letters of several types and also we have used lettering pens to excellent advantage and results. So you can see, we find that the truly artistic thing is of the most value, artistically and practically.

But this is not the only practical way that art can be used. I have some other classes which sound more practical than artistic but they are both. I refer to the classes in architectural drawing. Instead of giving the classes a knowledge of the orders the first thing, as so many older schools of architecture do, I begin with just what they feel that they can use, and we try to find out what we want first. Supposing we had three thousand dollars, or one thousand dollars or whatever amount we can assume we possess; not over three thousand at first nor under one thousand. Then we find a lot somewhere around town by enquiring, and that shows us what kind of a house we ought to build in that section of the city. Now many of my boys and girls are sons and daughters of carpenters, builders and contractors, so that the minute they come into the class they have a future interest at stake and their people at home help them. After we have chosen the location and price, we draw floor plans at the start, working from one step to another, thinking all the while of the woman's end of the house, closets and kitchens, and planning that if we should want to sell we could show a house that would be adequate for other people as well as our own immediate tastes, which might be freakish. Then before we finish completely our ideas about the floor plan we sketch elevations of the same plan and see if it will look artistic as to proportion, spacing and dark and light, for we must know how the light comes into the rooms, and how the house faces. There is much talking over this, before we begin to draw accurately to scale the plan of the house. Then the questions begin to come in and the obstacles arise as to right dimensions, and altho I have blueprints of other houses, they, of course, do not always fill the needs of the pupils. But we are trying to make it practical.

Gradually the house becomes completed so that by the end of the first term the student has drawn complete working plans of a house from the cellar and basement plan to the roof plan, with details of all windows, frame construction, and interior details. We figure out the cost of that first bungalow, from the timber to the painting and hardware, and the boys are ready to go ahead and build the houses if they have to. Most of the boys try for positions in some of the architects' offices during the summer. Several of them have been successful. One boy who had taken only one term's work with me drew a plan to relieve the congested streets in the city here by building a tunnel under the river. He took his plan to the Board of Public Works and his plan is being now considered. But why! It is to develop originality that I am trying for, and what every teacher should try for. Why! What is the use in allowing that little fertile mind full of ideas, to draw a vase when he could just as well be drawing a curve just as beautiful in making up a design. If he wants to make a vase look real, why don't you let him model it in clay? It would cost but a few cents more and he would learn the beauty of a curve much quicker, and in the end he would retain a knowledge of the beauty of a curve, and have a practical vase for God's beautiful flowers. All real beauty is practical.

But outside of drawing there is more than we can think of in practical worth. If a thing is useful it is practical. Pictures! Sure, for if you have a soul, if you have a home, you need to look at something beautiful if you want to express beauty, or

radiate unselfishness and love. For that reason, if you know what is beautiful, you can enjoy more, and altho all of us cannot become great artists, we can at least all have a simulative sense of the beautiful. Then when some one comes to our house they can enjoy coming there, just because we can make them feel that beauty that we have, and what is more practical than that?

But I have another class which I enjoy very much and which is working out some beautiful, practical ideas. We enjoy each other exceedingly and altho the poster class works very much over time and between time, yet this class enjoys just as much I think—I mean the class in design. Did you ever stop to think that design is used in more practical ways than one? I think since design is used so many ways to decorate or beautify it becomes practical. If a thing is homely and crude we immediately begin to hide it away, and if it is constructed by another on such lines that they are cold and hard, then we try to cover it over with some spots of design and thereby beautify it. A plain piece of white cloth is a mere piece of cloth but if you dye it, and then block-print it, it changes its value, and altho it may cover the same piece of furniture yet the beauty is increased manyfold, and its value many, many times. Why! Because the one who made it has put some of his personality into it, and if he should even copy another's design, he has put upon it what he felt was beautiful whether it was his own original dot and dash design or what he had learned by appreciation of another's design. But design is simple if you think according to art principles. In this design class we learn first what art principles are: 1. Opposition, 2. Transition, 3. Subordination, 4. Repetition, and 5. Symmetry. We also learn what Rhythm is, the three kinds, and what rhythm means. Then we collect tracings of all these examples and see which is the best.

This occupies many weeks and we are working out our original designs in the meantime. You see, as soon as we know what is good, then it arouses in us a feeling that we could so easily do as well as that, and we immediately think up something quick. Examples of what other students have done also help to stimulate the students' minds so that they can hardly wait to get to work, or to try their own ideas. But in all these problems we have a definite aim. Instead of just making a design for a window—an art glass window—I get an art glass window and show them. Tell them where they are made, how much the men who make them get for their work in designing and how the glass is made. Then we get tracings of other glass windows in some of the best art magazines. Then we try to think up what we can do. Someone suggests that a bird would make a good motive or perhaps a ship would make another. Then we decide that a ship would be the best. We can all draw a ship pretty well. Then a ship it is, and away they go arranging the ship in such a way that they retain what art principles? Rhythm, proportion, good dark and light. That is the aim of the problem. Added to this comes the color.

Now for color schemes. Shall it be made realistic, with a blue sky, green water, and what color of a ship? You will find that if up to this time they have copied good color schemes they will invariably make a fine design out of the ship, with not so much feeling for the representative but a feeling for excellent line and rhythm, and above all color, which is innate to a greater or lesser degree of excellence. Do you ask if they enjoy this or is there a feeling of work and a "get thru with it feeling?" With no exceptions there is a strong feeling of happiness in the work and a result that is in most cases very excellent. Of course some become more sensitive to the artistic while others work out their ideas more crudely. But they all know sooner or later what is good, and what is not good in art, so that when they will perhaps make their own dresses, or design their own business, they will know what is good. No matter how matter of fact a student is, he will soon learn that perhaps he cannot draw, but he will know enough that when an artist shows him one kind of design to advertise his goods, and a "would be" artist shows him another, he will be able to choose the artistic, and have a large poster for the billboards that will not offend the eye but will attract attention because it is more beautiful than the other. For that very reason he will sell more goods, for advertising does pay. But did the matter-of-fact boy learn to draw? No. His drawings were crude and not very neat, but he knew color, and he learned what was good art. He tried to do the best he could and worked hard. He was not an artist and he never would be, so why try to teach him how to draw, any more than you would try to teach some people how to write? Do the best novelists or the best writers always write the best? No.

It is not so much what you draw, but how you draw it. You will agree with me there, but if you express a painting of peaches so accurately, with every little spot minutely drawn, you have told the last word about them, and there is no more to say. Why don't you take a colored photograph of them? But if you let each one in the class give you a suggestion of those peaches in an artistic way, you have something left for your imagination, and imagination, or mystery is the thing that attracts you in a painting, a drama, or play, a joke, or in any work in art. Express enough to be sure, for you want to know what it is, but to draw just for drawing's sake alone as has been done for so many years in our schools, is fast becoming a side issue and only a means to an end, not what makes it the only aim of art. To be sure to draw correctly is an accomplishment,

but it is not what makes the artist, nor develops us all, for only a *few* can draw, while *all* can have that appreciation, which is the practical value of art. I wish I could tell you more of this last class in design, for we have made many things of beauty and practical value. One girl has block printed a whole dress, using her needle to embroider the bright spots on the little blocks printed.

In conclusion let me say, that if art appreciation is emphasized and drawing is allowed to take care of itself, in the expression of ideas, we will find results in the years to come that will surprise you in more than just the narrow confines of the art realm. We will have beauty and an American art which we do not possess today. It will bring more happiness than you can imagine, for more of us will be able to make and create what we want to beautify, and more of us will choose the very best and not be satisfied with this awful accent in colors always on the loud pedal, with no sense of refinement.

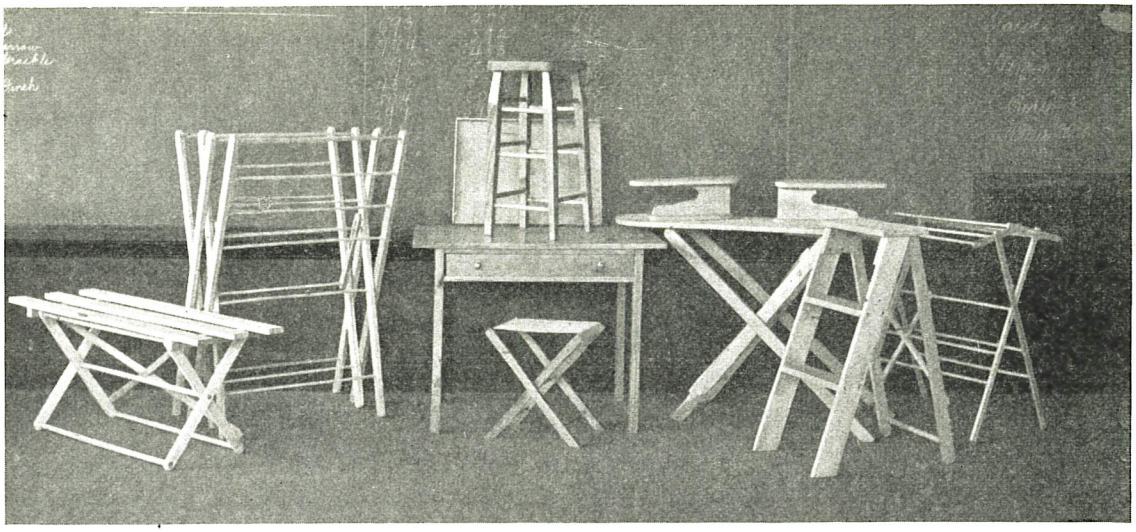
OUR CRAFT.

Over his whirring wheel that hums and sings,
The potter, silent, bends the whole day long,
And molds with patient thumb, while whirls the song,
The clay in countless shapes of wondrous things.

But mark the wheel's swift flight! How far it flings
Aside the needless clay! Steady and long
The work must still go on, if clear and strong
The master's touch will find each vessel rings.

We, too, are potters. And from day to day
With thumbs that grope, yet oft with clumsy art,
The semblance of God's likeness seek to trace
Upon the breathing, thinking, plastic clay
That waits our touch. At last, with throbbing hearts,
In the master Potter's hands, our work, we place.

—Lila M. Delano.



GROUP OF PROBLEMS MADE BY THE AUTHOR'S STUDENTS.

KITCHEN PROBLEMS IN WOODWORKING

Leon H. Baxter, Director of Manual Training, St. Johnsbury, Vt.

THE accompanying photograph shows a group of useful articles suitable for kitchen use and were made by boys in the eighth and ninth grades of the St. Johnsbury schools. The projects were first undertaken to comply with a request for such furnishings for the Domestic Science department.

The boys liked the work so well that a large number were made by individual boys in the classes.

When they compared the cost of constructing these problems with the market value they were doubly eager to make them. Take for instance the large folding clothes rack; it cost the boys forty-five cents to make and the stores here were selling them at from eighty-five cents to a dollar. All problems were made of bass or pine.

Large Folding Clothes Rack.

This is an interesting and desirable problem requiring careful locating of the holes for the dowel rods.

The eight legs are first cut out of $\frac{7}{8}''$ bass, to required dimensions, $\frac{7}{8}''$x$1\frac{1}{2}''$x48$''$, planed square on edges and the ends rounded by use of the dividers, chisel and file.

The holes are first located in pencil and when approved are bored with a No. 8 bit. Care should be taken to have a scrap piece of wood behind the work to prevent the bit's splitting the wood as it comes thru.

The two braces are next made to size and the slot cut by using the same bit as before and paring out with a chisel and truing up with a file.

Cut the dowels next as specified and assemble the parts, first sanding all over carefully.

Frequent reference to the perspective sketch is necessary to see just where the short dowels are to be placed. Hold them in place by driving inch brads thru the legs into them. Do not brad at places where they have to turn. No finish is applied. The small rack is made in a similar manner.

Step Ladder.

A very useful article about the home and can be made higher by adding another step.

These were first made by the classes for the janitors, who found them light, strong and easy to carry about.

The drawing gives all necessary figures. The dimensions must be followed very closely or the ladder will not set plumb.

Special care must be taken in cutting the grooves in the legs to receive steps.

After obtaining the required angle at the bottom of the legs, set the T-bevel to this and use thruout the rest of angular work.

It is a good plan to cut the grooves in a mitre box.

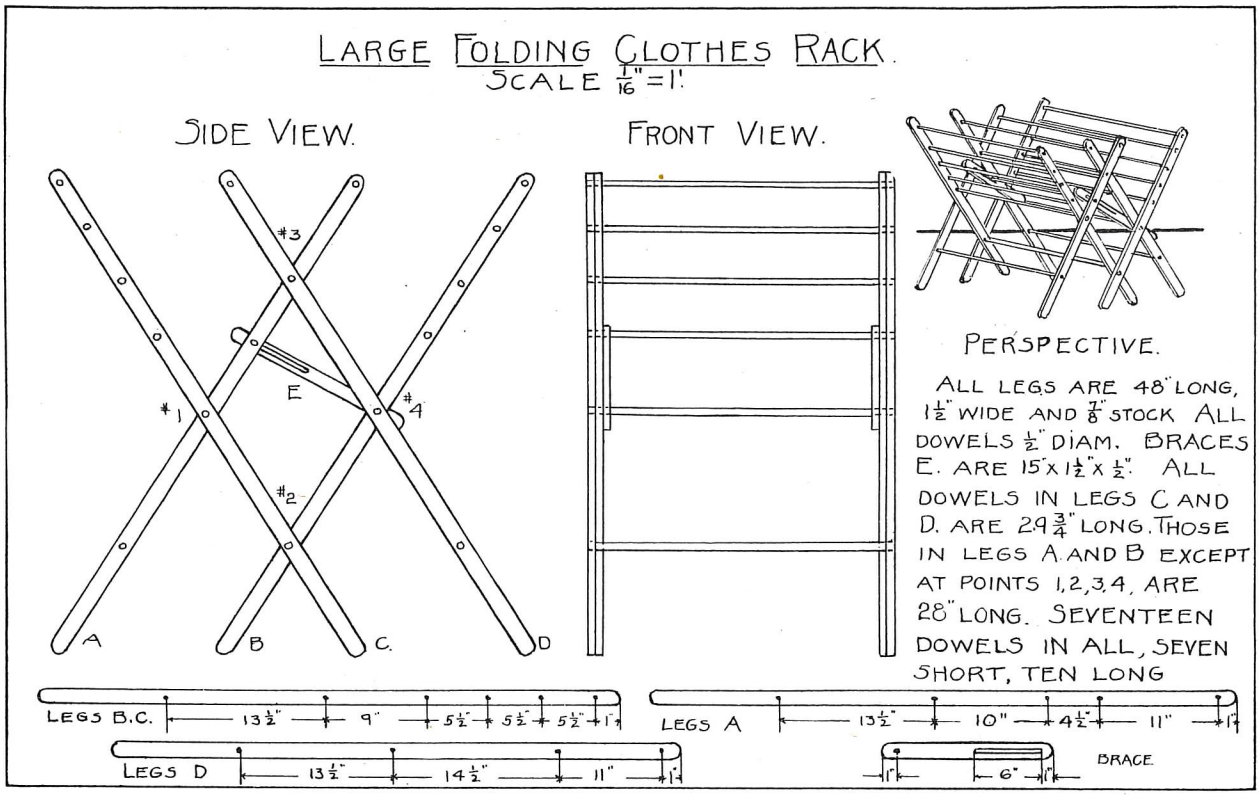
After all parts are accurately cut the steps should be assembled with the legs, using $1\frac{1}{4}''$ No. 8 R. H. wood screws, as shown. Next attach the cleats at top, screwing them on from inside of legs with $1\frac{1}{4}''$ No. 8 flat head screws.

Attach top by means of three screws on a side, $1\frac{1}{4}''$ flat head, countersunk into wood.

Assemble the rear legs with $\frac{3}{4}''$ dowels, as shown, being sure to bore the hole in cleat far enough from top to allow clearance for ends. Hold dowels firm by means of $\frac{3}{4}''$ flat head screws countersunk.

Make a middle lap joint in braces at E and hold by $\frac{3}{4}''$ screw. Attach ends of the braces to the legs in similar manner, beveling them to follow side of the legs.

Two small lengths of plumber's chain, screwed on as shown, hold legs at the required angle. Sandpaper and leave without finish.

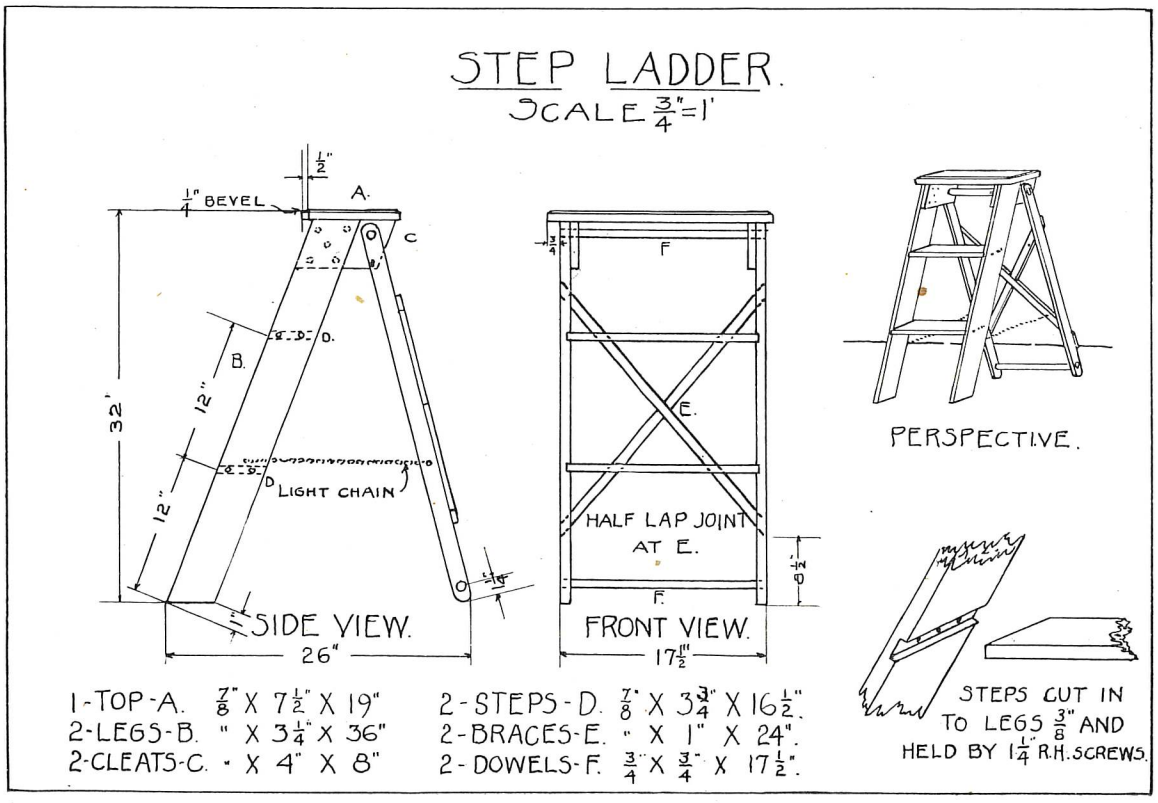


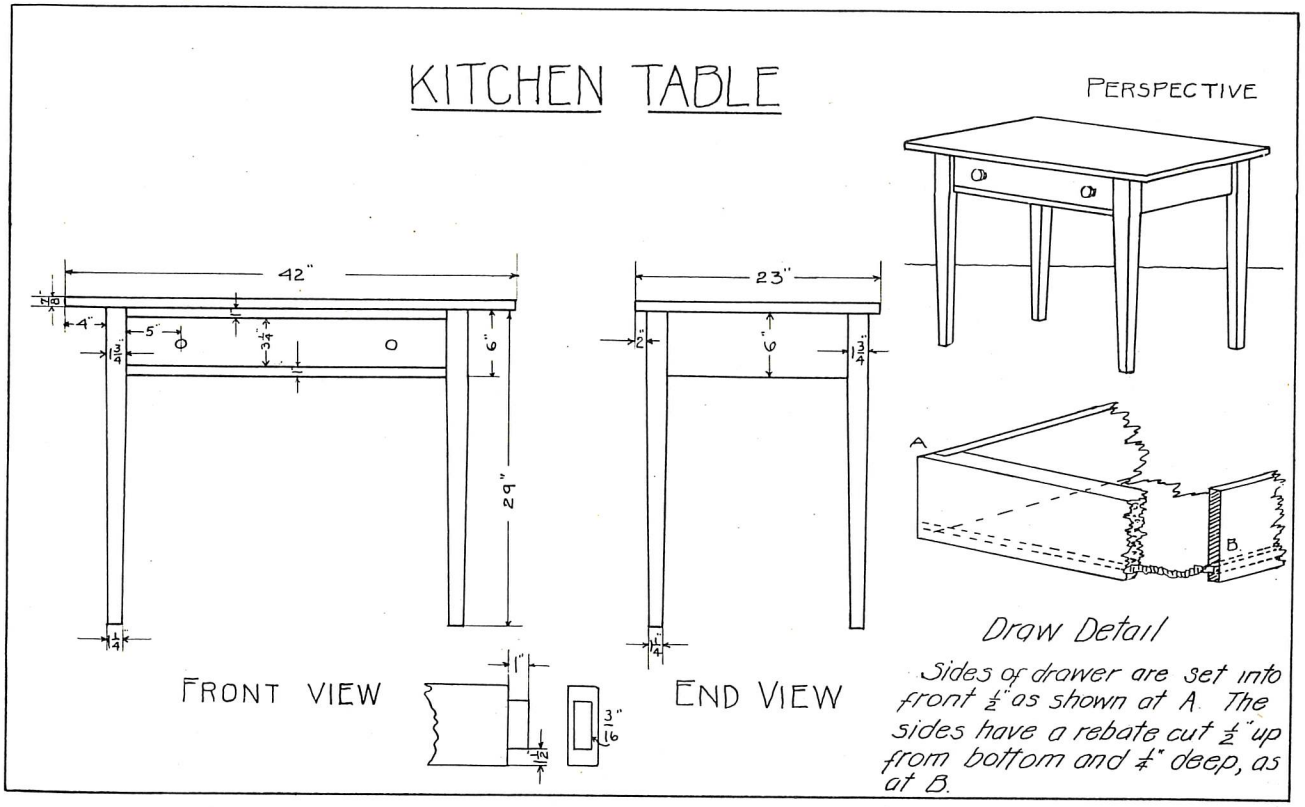
Kitchen Table.

This is a soft wood table, light and easily constructed.

Get out the legs first to size, $1\frac{3}{4}''$ sq. by 29". Measure down six inches from top end and square a line around. At further end of legs measure in from each side $\frac{1}{4}''$ and draw to line previously made. Plane to this line on each side of leg, making the bottom $1\frac{1}{4}''$ sq.

Get out the side rails next, $\frac{7}{8}''$x6"x17$\frac{1}{2}''$, and cut a tenon as shown on the drawing. Cut a corresponding mortise in the legs and glue up with hot glue. Next cut the long rail at the rear of table and then the two small rails which go above and below





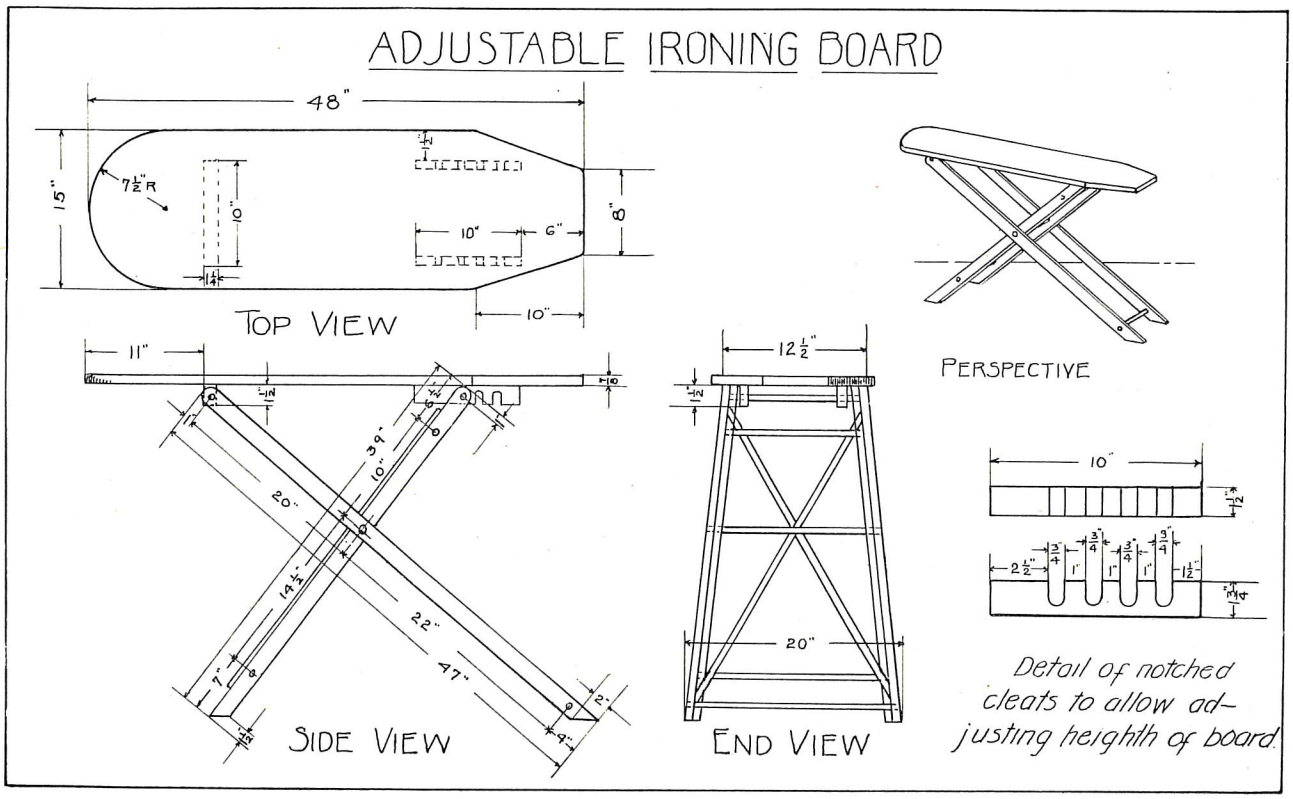
the drawer. Long rail to be $\frac{7}{8}''$x6$''$x32$\frac{1}{2}''$ and the two narrow pieces $\frac{7}{8}''$x1$''$x32$\frac{1}{2}''$. Cut tenons on these and mortises to correspond as shown. On the narrow pieces make the tenon $\frac{1}{2}''$ sq.

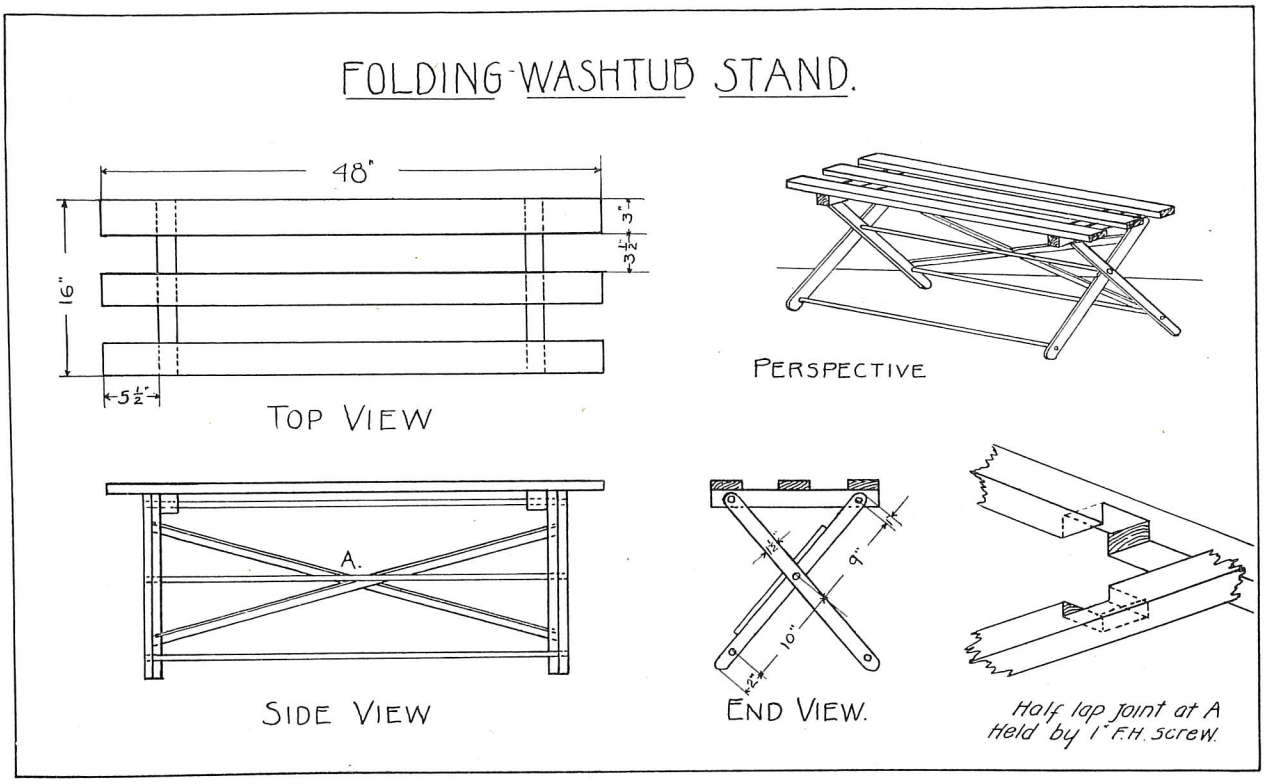
Glue up the top to the required size and then glue the two sets of legs together. While these are drying get out the stock for the drawer.

The front is to be $\frac{7}{8}''$x3$\frac{1}{4}''$x30$\frac{3}{8}''$. Make the two sides $\frac{1}{2}''$x10$''$x3$\frac{1}{4}''$ and the rear partition $\frac{1}{2}''$x 3$\frac{1}{4}''$x30$\frac{3}{8}''$.

Cut the rabbet, as shown, making it $\frac{1}{4}''$ wide to receive the bottom for the drawer, which is to be made of $\frac{1}{4}''$ stock.

Cut the joints in drawer front to receive the



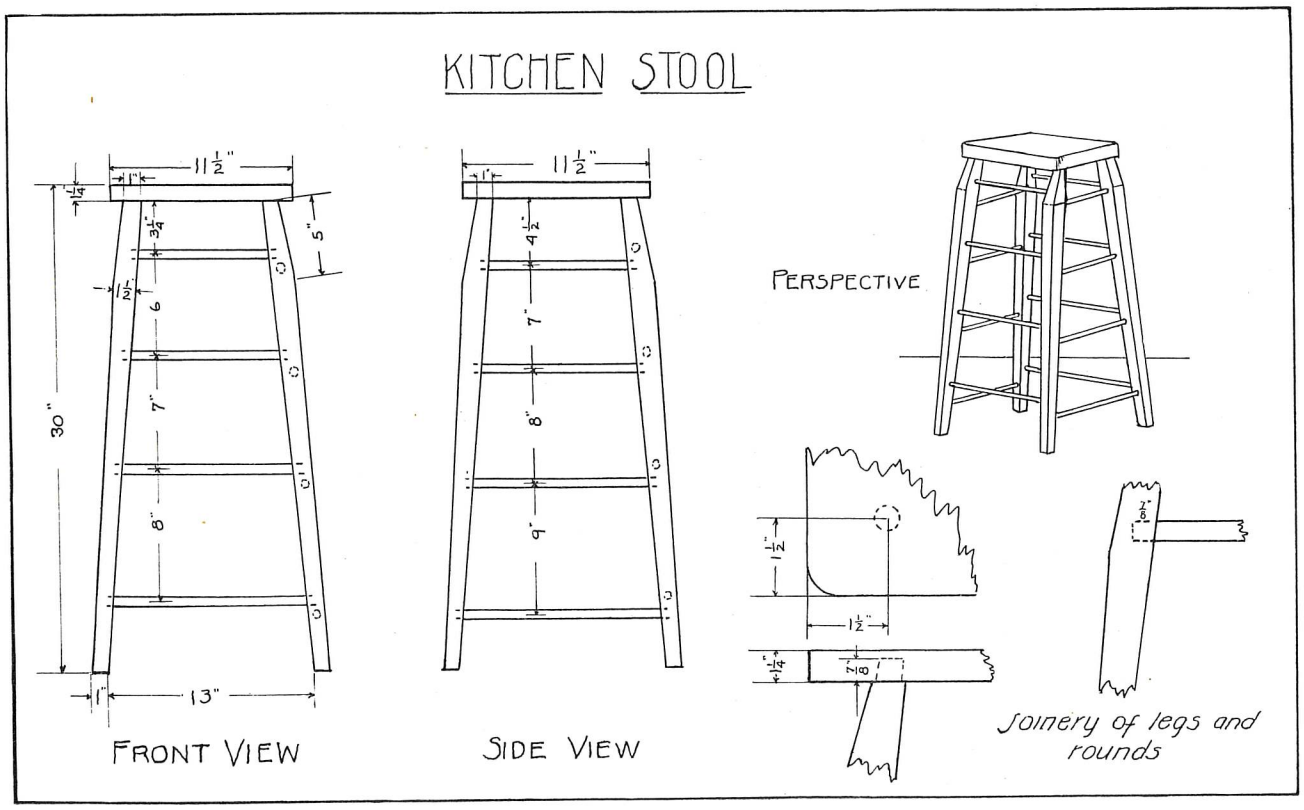


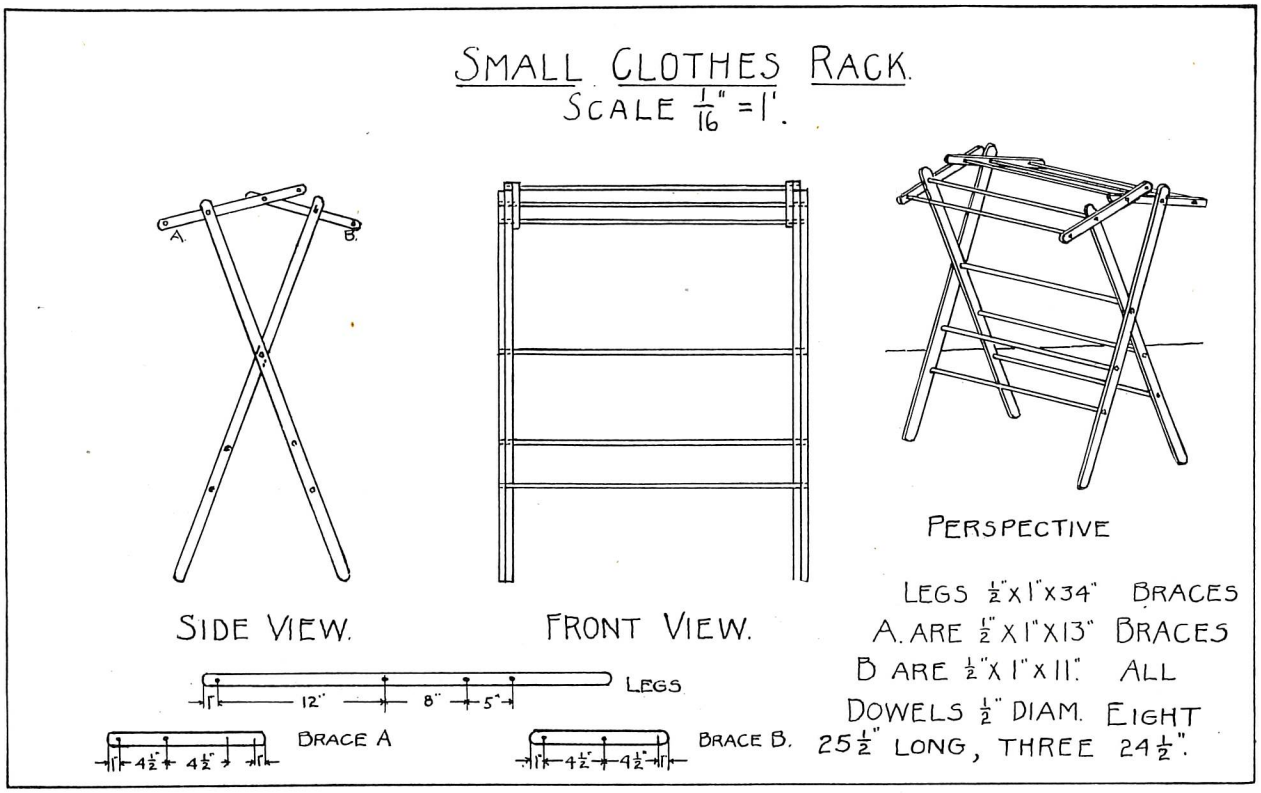
sides and then glue up drawer and hold by 1″ brads.

See that the drawer fits the opening for it and brad a small block to the back rail of table, large enough to act as a stop for the drawer and leaving drawer front flush with the front rails.

Screw cleats made of wood $\frac{7}{8}$″ square and any convenient length to top of sides of rails inside the table. Make holes in these so that they can be screwed to the top, thus holding it in place. Be sure the top overhangs evenly on the sides and ends.

Sandpaper the whole table carefully, removing all glue, and apply two coats of shellac. The drawer-pulls many be turned on the lathes or metal ones bought at a hardware store.





Adjustable Ironing Board.

This board can be adjusted to four different heights and is an interesting problem to make.

It is not necessary to go into detail regarding its construction as the drawing shows all dimensions.

Care should be taken to have the top doweled and glued in a first-class manner as the heat from the irons would soon open up a poor joint.

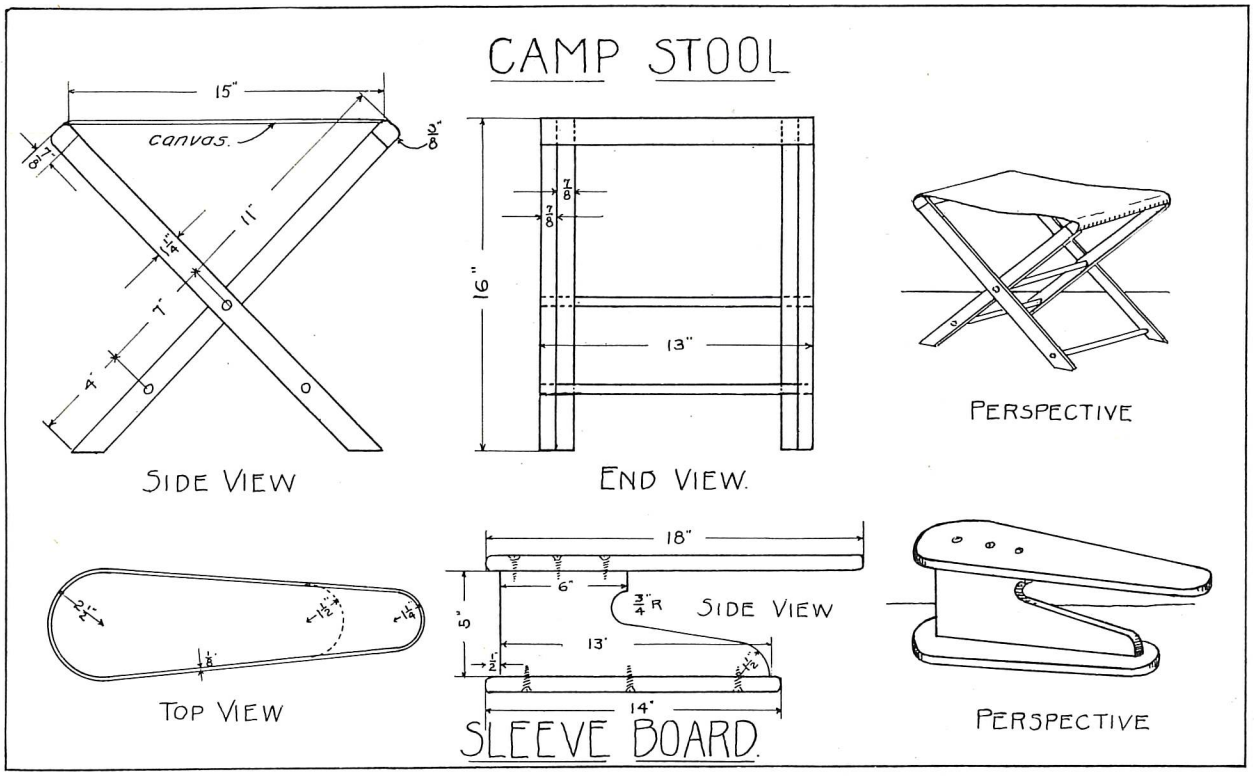
The holes for the $\frac{3}{4}''$ dowels must be accurately located to insure stability in the board.

A longer top may be made if desired.

Folding Tub-Stand.

This is a simply constructed article of utility and may be used as a settee as well.

The parts are made up from $\frac{7}{8}''$ stock, to the



dimensions specified. Care should be taken to have ends and edges square.

After rounding the ends, bore holes in the legs as shown, and cut three dowels $40\frac{1}{2}''$ long and two $38\frac{3}{4}''$ long. These are $\frac{3}{4}''$ dowels. These are held in the holes by brads where required.

Attach the three slats to the cleats by $1\frac{1}{4}''$ flat head screws, countersunk, two at each end.

The cross braces at the back meet in a middle lap joint and are $\frac{7}{8}''$x$1''$x$36''$, beveled at ends to conform to shape of the legs. Attach these by $1\frac{1}{4}''$ screws, countersunk. Sandpaper all over.

Kitchen Stool.

This is a useful article about the home and can be used also as a step ladder.

The top is $11\frac{1}{2}''$ square and the legs are $29''$ long, and $1''$ square at the top and bottom. Five inches from the top the legs flare on the two outside faces to $1\frac{1}{2}''$. This requires careful planing. The top of the legs have a tenon $\frac{3}{4}''$ long and $\frac{3}{4}''$ square, cut to be set into a corresponding mortise in the top.

The stool is $13''$ wide between the legs at the bottom and $7\frac{1}{2}''$ wide at the top. Lay the legs in this position flat on the floor and take the dowel rods and lay in proper places, allowing $\frac{5}{8}''$ at each end to be set into the legs. Cut the required length. Bore the holes with a No. 11 bit and file the $\frac{3}{4}''$ dowels to fit and insure a tight joint.

Assemble with hot glue and hold dowels by a $1''$ brad driven thru the leg. Sandpaper and apply two coats of shellac.

Camp Stool and Sleeve Board.

These two problems were successfully worked out in the seventh grade and the drawings give all necessary information. The camp stool has a canvas seat $11\frac{1}{4}''$x$20''$ which is tacked to the underside of crosspieces with 6-oz. tacks, $\frac{1}{2}''$ apart. The sleeve board brings in the use of the expansion bit.

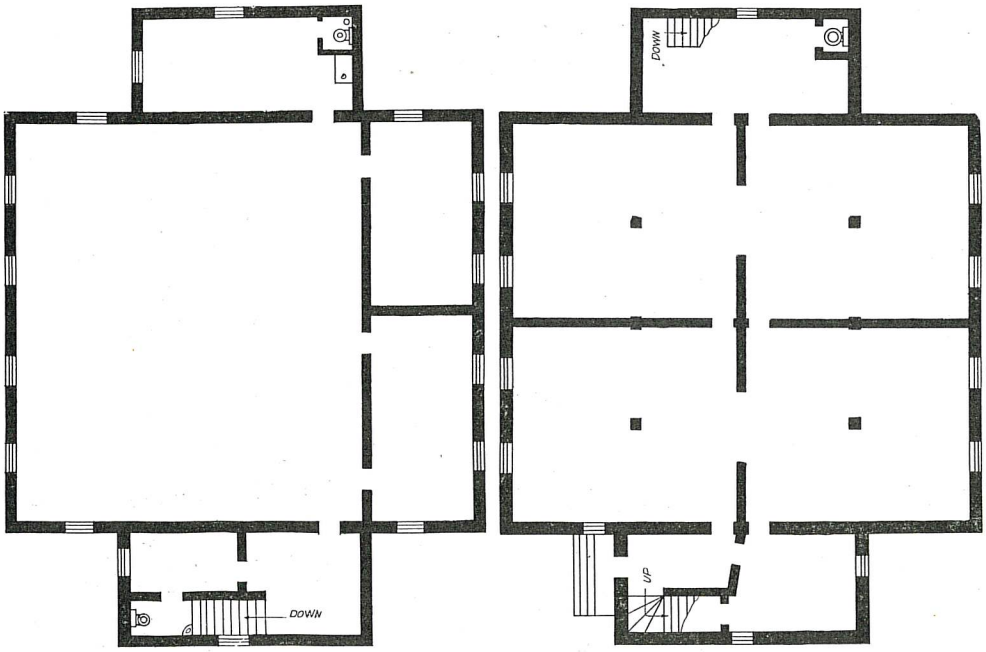
The Story of the Elmira Vocational School

C. J. Merchant, Elmira, N. Y.

Special Meeting, Board of Education, December 13, 1912.

Resolved, that the number of standing committees be increased by one, to be known as the industrial committee, said committee to be composed of three members, one of which shall be the President of the Board. This committee to have entire charge of vocational work and manual training in all the schools of the city, and subject to the approval of the Board, shall purchase supplies, employ teachers, order repairs to vocational school building and otherwise direct the affairs of the department. Carried.

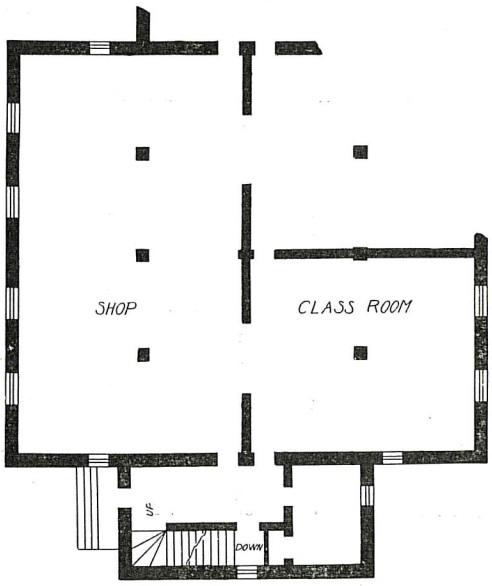
WITH this resolution and the fact that there existed an old abandoned two-story brick building owned by the city, begins the story of the Elmira Vocational School for Boys. The building had not been used for school work for quite a number of years but had been used recently for manufacturing purposes by a private concern. An inspection of the building to determine whether it could be remodeled without great expense for purposes of vocational education, proved very interesting but not very promising. However, it was decided to start school in this building, and the work of remodeling was begun and has continued ever since. The remodeling was practically all done by the boys of the school under the direction and supervision of teachers. As a result, the building has been greatly improved and adapted to vocational work. To most people the undertaking seemed to be an experiment; therefore, whatever was done in the matters of repairs to the building and the first equipment should be only what was needed to begin the work of the school.



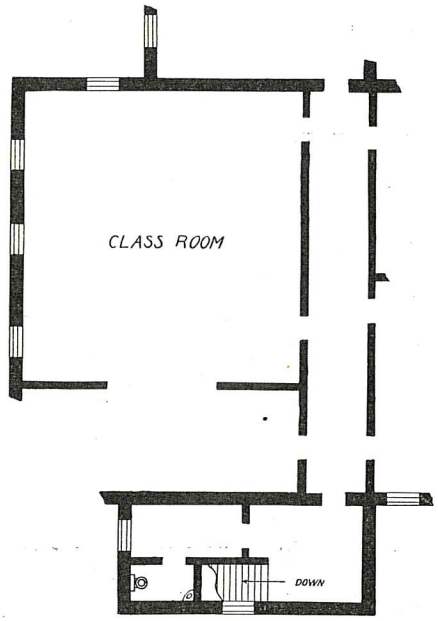
SECOND FLOOR PLAN. FIRST FLOOR PLAN.

Floor Plans of the Elmira Vocational School Building when purchased from the original owners.

To this end, one room was fitted up with desks for classwork, and partitions removed in the second to make space for shopwork. Each student spent one-half day in the classroom and the other half in the shop or on the repairs of the building. Both types of work were confined to woodworking. In a short time the boys had completed a classroom on the second floor so that the first



First Floor Plan as Altered in February, 1913.



Second Floor Plan Altered for Classroom Use April, 1913.

moving day was in order. Since this time moving days have played a very important part in the institution. With the installation of the woodshop machines began the preparation of an additional shoproom and classrooms to be used in the following September.

At the opening of school, after vacation, came on the regulars with an additional force of new recruits. Another moving day and the regulars found themselves in the new metal department, while the new recruits filled in the ranks of the woodworking force. The progress could not stop at this point, for there was still some unoccupied space in the now busy factory. Why should the student's fundamental training stop at this point? There might be an expert electrician or a good plumber in the group. At any rate it was thought advisable to begin the plumbing and electrical work. Therefore at the beginning of the second term, February, 1914, another moving day arrived when the classes moved up and new members were added to the industrial society. Thus, with the old building now filled to its capacity and new students waiting admission the school completed another year.

Something must be done to provide space for the September class. There was plenty of ambition and sufficient ground space for the construction of an annex to the electrical department. Accordingly we find the following:

Board of Education, City Hall,
Elmira, N. Y.

Regular Meeting, Sept. 23, 1914.

Gentlemen: Your building committee would recommend that a sum not exceeding $100 be appropriated for building a temporary addition to No. 6 (vocational) building to provide more room for the electrical department.

Carried.

Thus came limited capital, unlimited energy, and the power to act. It is needless to mention that the building was completed in record breaking time with entire satisfaction to all concerned.

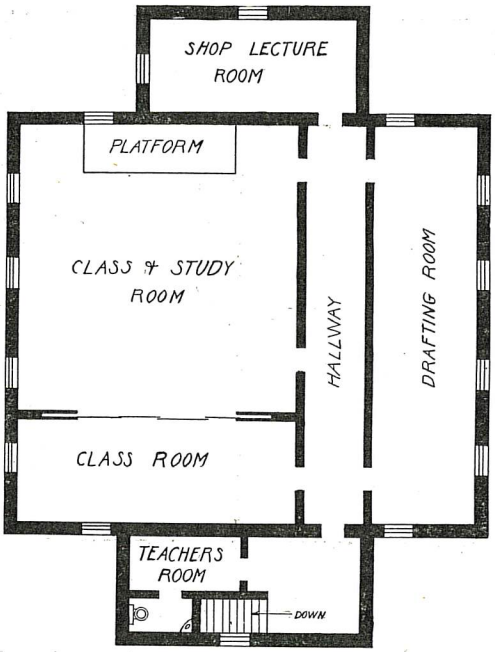
This little corner proved to be a seedling for the greater plants which were to follow. And again we read under date of Nov. 16, 1914:

Board of Education, Regular Meeting.

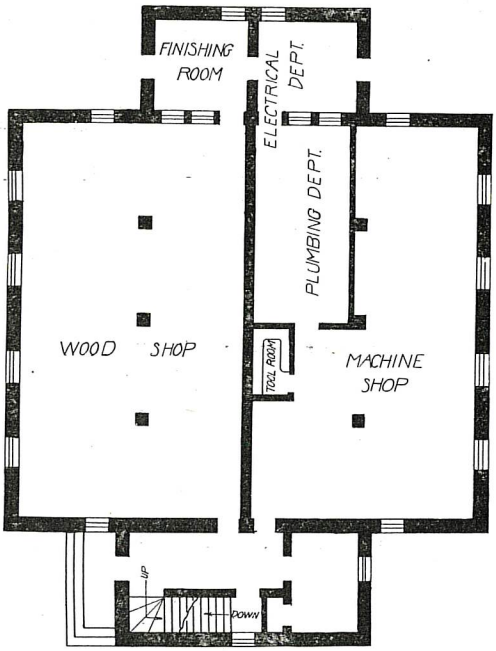
Gentlemen: Your building committee would recommend a sum of $350, to be used towards additions to the vocational school.

Carried.

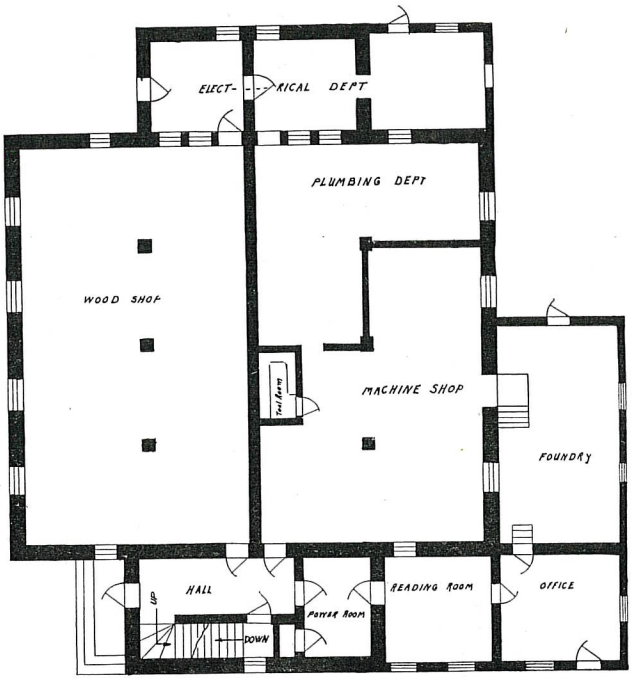
It now became possible to have another moving day—to move the walls outward as it seemed, for the plumbing department needed more space and a molding and foundry room was essential to the metal work. Again another theory became a reality. Boys were able to excavate for a foundation, to mix concrete, to build a workshop and schoolhouse, to finish its



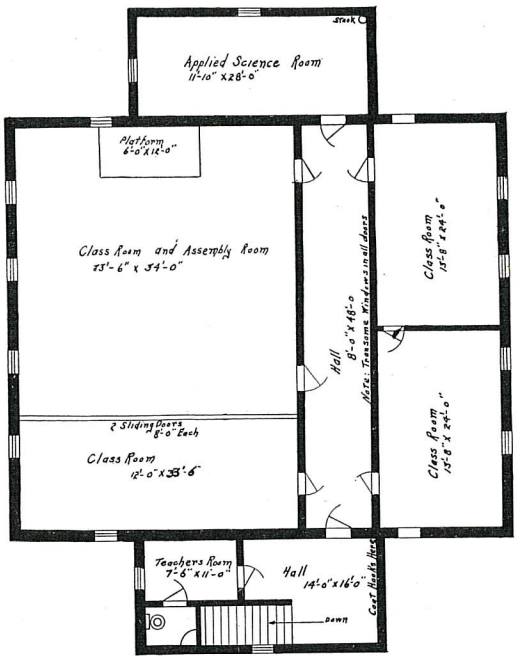
Second Floor Plan as Rearranged by Students During 1913 and 1914.



First Floor After Alterations Made by Students in 1913 and 1914.



First Floor Plan Showing Changes Made in 1914-1915.

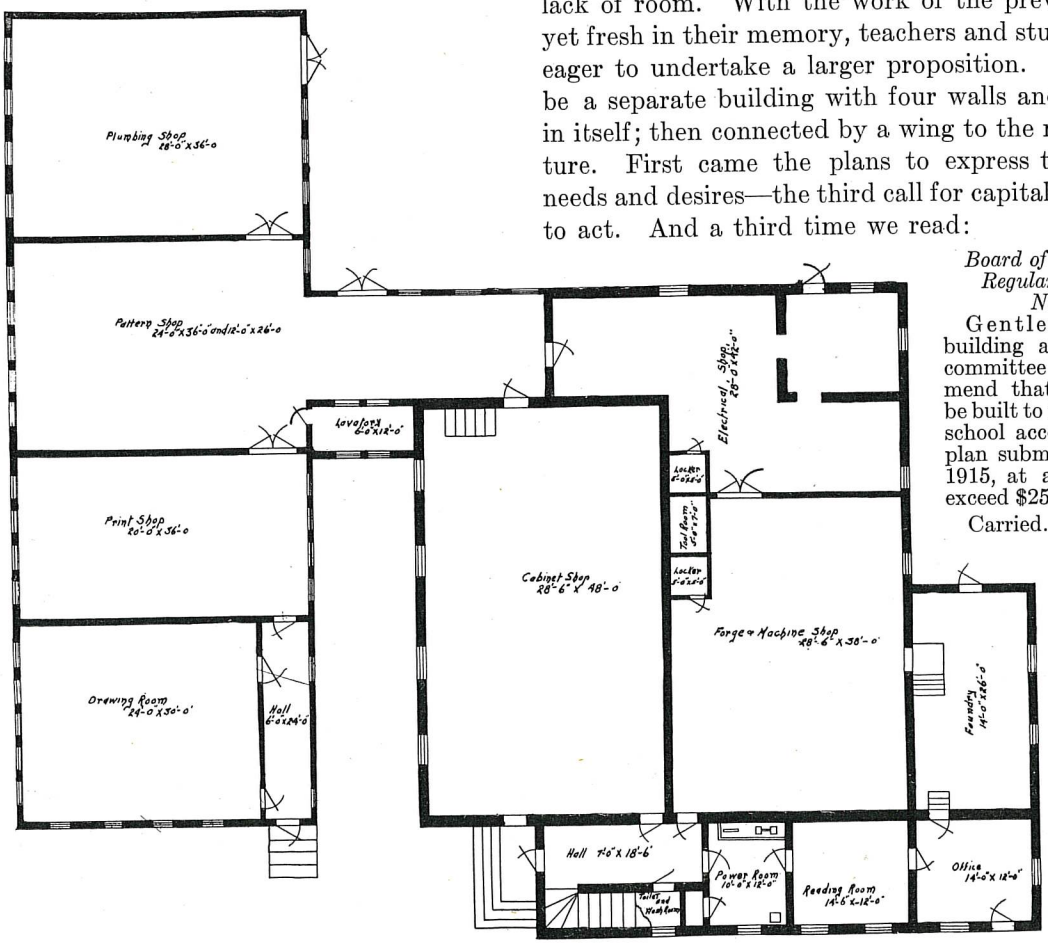


Second Floor Plan of Building as It Stands Today.

interior, to install steam heating and to wire for electric lights.

They had created that which they were a part of, for with each moving day came the work of installing machinery and equipment. This method furnished the best practical application for there was work for every department. In brief the boys had experienced a very busy but profitable school year.

September, 1915, brought the school face to face with the same old problem, viz., more students—lack of room. With the work of the previous years yet fresh in their memory, teachers and students were eager to undertake a larger proposition. This must be a separate building with four walls and complete in itself; then connected by a wing to the main structure. First came the plans to express the school's needs and desires—the third call for capital and power to act. And a third time we read:

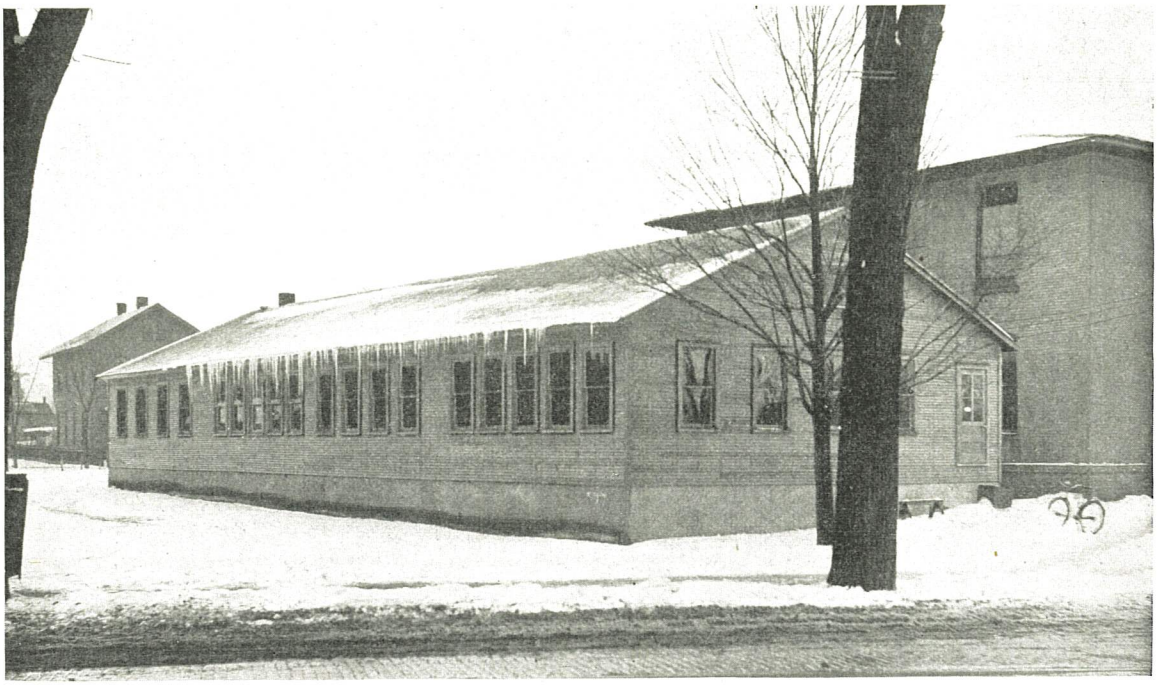


First Floor Plan of New and Old Building at Present Time.

Board of Education,
Regular Meeting,
Nov. 1, 1915.

Gentlemen: Your building and industrial committee would recommend that an addition be built to the vocational school according to the plan submitted Oct. 18, 1915, at a cost not to exceed $2500.

Carried.



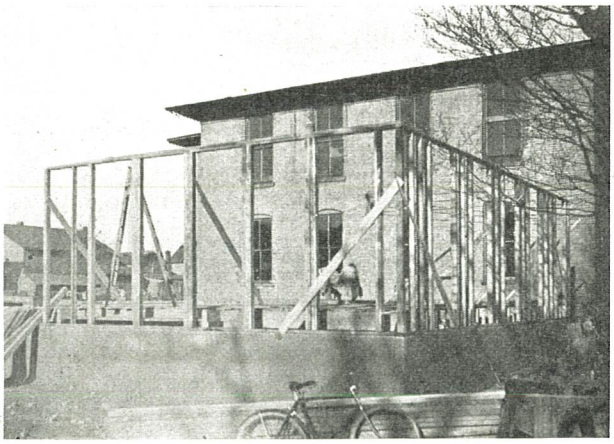
THE COMPLETED BUILDING.

The solicited opportunity had now been presented to the school. Did it make good, you ask? Just a glance at the photos of its "progress in construction," is proof enough that every detail was carried out to produce a complete building, which has received the highest commendation from the State Educational Department and others. The annex is 36 ft. wide and 96 ft. long, connected to the main building by a wing 12 ft. by 24 ft. The building from foundation to roof, including steam heating, electric lighting, and installation of machinery, has been constructed by the boys. The foundation was put up in two and one-half days, which included one Saturday when the boys gave up their holiday and came back just to help the building grow.

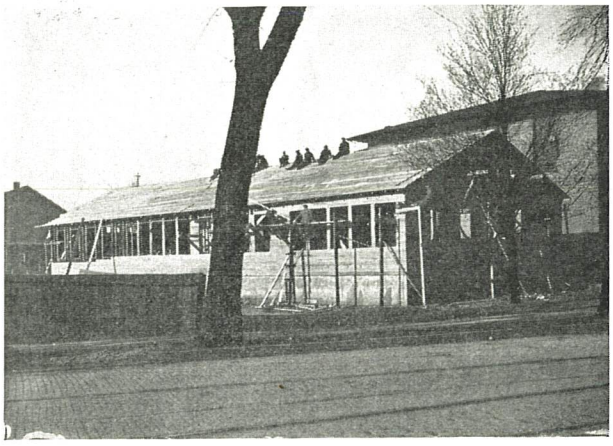
The school is growing so rapidly that it will be only a question of a year or so when a larger building may have to be provided by the city of Elmira to accommodate the increasing number of pupils and the growing work. It is believed that the city will do this ungrudgingly when the purpose of the school and its work become more widely known. It is very gratifying that the strongest and most enthusiastic advocates are those people who have visited the school and know its work from personal observation.

The school maintains both intermediate and high school departments. The intermediate department offers a two-year course to boys who have completed the sixth grade. The high school course is open to graduates of the intermediate course or graduates of the grammar schools. New York State regents' certificates and diplomas are granted to students who satisfactorily complete the courses.

Attention is called to the various floor plans which show the growth of the building in accordance with the growth of the school. A bulletin, giving complete details of courses of study, equipment and general information, has been printed for distribution.



Portion of Frame Work Erected.



Sides and Roof On.

BUILDING THE ADDITION.

Sheet Metal as a Manual Training Subject

J. S. Daugherty, Instructor in Sheet Metal Work, Carnegie Institute of Technology, Pittsburgh, Pa.

SINCE the introduction of manual training into the public schools of this country, woodworking and mechanics in one form or another have formed the basis of this work, with wood and iron as the material. In recent years other materials have been found that possess educational values equal to those first adopted. Prominent educators in this country who are developing the manual arts and who have given the subject of vocational education years of their best efforts and study, have been led to believe that sheetmetal working in its many branches has many possibilities in the course of study of elementary and high schools. The work has grown and developed, its value has been demonstrated to school authorities, and it has been given a place in many school courses side by side with other subjects.

The cost of material for this work is less than wood and should consist of sheetmetal of various kinds. Practical problems can be given for the construction of articles for the home or school use, giving the student practice in the working of tin plate, galvanized and black sheet iron, wire, solder, zinc, light sheet copper, and brass. The cost of material should be taken into consideration when planning a course and should govern the size as well as the choice of all problems and exercises. If sheet copper is included in the list of materials, the course may be planned to include problems in art-metal work that are worked out and wrought into shape by hand, giving the student excellent practice in the different processes used in the construction of small trays, book ends, paper knives, watch fobs, candle holders, pen trays, candle shades, letter holders, flower vases, lanterns, etc. The course may be planned in such a way as to carry this work along with the woodwork by applying some of the exercises in metal. Fittings for a cabinet, box or chest can be designed and made, such as hinges, escutcheons, handles of various kinds, box corners, and straps to strengthen joints. If the student can work out his own design, the educational value of this work is greatly increased.

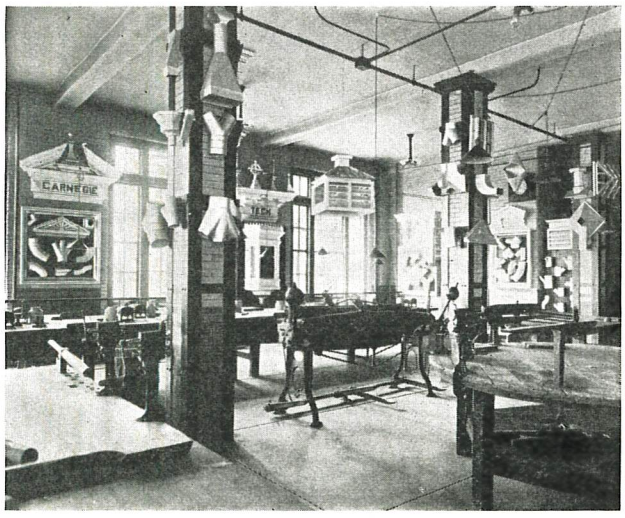
Elementary Sheet Metal Course.

In an elementary sheetmetal course where copper work is not included, a great variety of problems can be constructed from tin plate, light galvanized iron and black sheet iron, giving practice in the processes of cutting, wiring, grooving, riveting, seaming, forming, edging, double seaming, filing and soldering. The following problems may be adapted to a course of this kind, and are a few of an endless number of useful articles that can be worked out by the student for home and school use:

small cup	funnel
apple corer	fruit-filler
oil can	match box
cake pan	strainer
cake box	hall lantern
liquid measures	mail box
dipper	dust pan
bank for savings	tea steepers
roasting pans	coffee pot
pencil box	porch light
watering pot	cereal boiler
tool box	flour scoop
sink strainer	waste cans
candle holder	lamp shade

colonial lantern

Industrial Teachers' Class, Carnegie Technical Sheet Metal Shop.

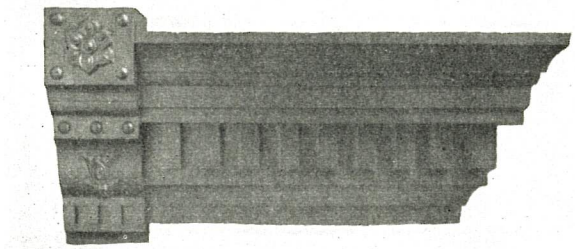


"One Corner" Carnegie Technical Sheet Metal Shop.

The tool and machine processes used in the construction of these problems form the basis of the mechanical part of the sheetmetal trade, and when thoroly mastered by the student he is ready for advanced work. Interest is an element that must be developed in any course of study; in sheetmetal work this interest is easily maintained. The problems can be presented to the student in a form that is within his possibilities and will be of some real value to him when completed.

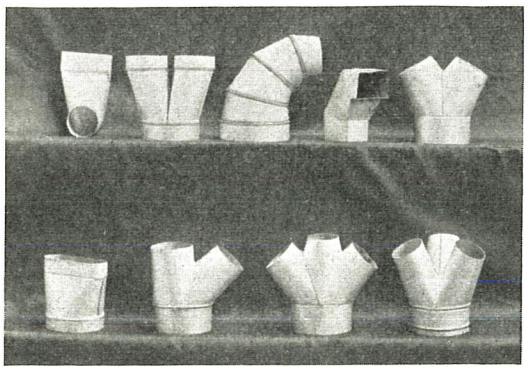
Advanced Sheet Metal Course.

This part of the course should consist of practical problems relating to building construction and heating and ventilating work, giving the student practice in the development of patterns and construction of

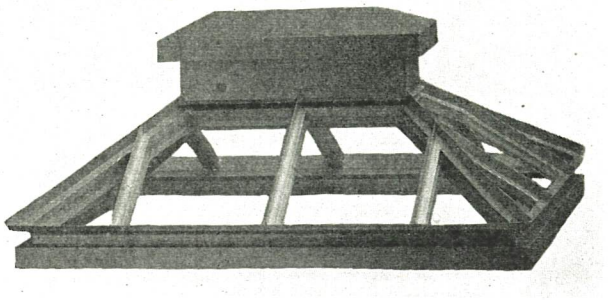


Ornamental Cornice.

elbows of different angles and number of pieces, miters between moldings of various profiles, gutter miters, chimney tops, ventilator heads, roof finials, conductor heads, window caps, plain and ornamental cornices, dormer windows, bay windows, skylights, and architectural sheetmetal work of all kinds. In this work details can be made from scaled drawings, patterns developed and transferred to metal, cut, formed up, and parts assembled. The students are taught to use the same tools and machines as they would use in regular employment and work under conditions somewhat similar to those they would encounter in a commercial shop. The models in this section of the course can be made in small form from light galvanized iron and will show any defects



Classwork in Elbows and Angles.

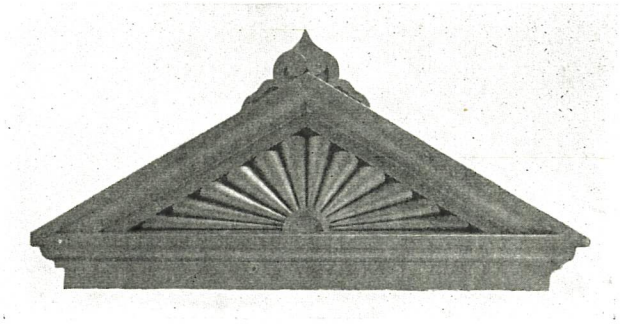


A Skylight Frame.

in the construction, or error in the drawing which might otherwise be overlooked.

Drawing.

Drawing forms a very important part in a sheetmetal course. Before a pattern for any problem in sheetmetal work can be laid out, a working drawing of the article must first be made. In the case of plain articles, the drawing can be made directly on the metal. In the majority of cases the work is of such a nature that it is necessary to make a full-sized detail drawing on the drawing board; the student must be trained in the principles which underlie the making and drafting of all patterns for sheetmetal work, for the patterns he must develop are the surfaces of objects of various forms that may be said to represent geometric solids. A knowledge of geometrical drawing and projection drawing is necessary that the



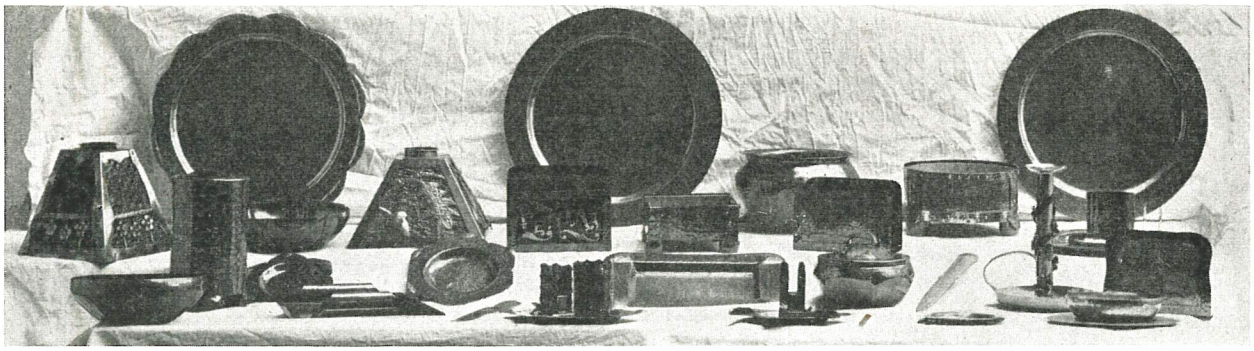
Roof Finial.

student may understand the operations involved in developing the surfaces of a solid.

Imagination is a valuable assistant to the student in sheetmetal pattern drafting, as he must picture to himself the completed article as it will appear when the surfaces laid out on the drawing board are formed up. This imaginary part of the study is of great value. To attain the best results, the problems in drawing and shopwork should be carried along together, the student making a drawing of the object, then constructing it from sheetmetal.

Equipment.

The equipment is not unduly expensive and may be made as extensive as one desires to make it. A small set of hand machines and a few each of the

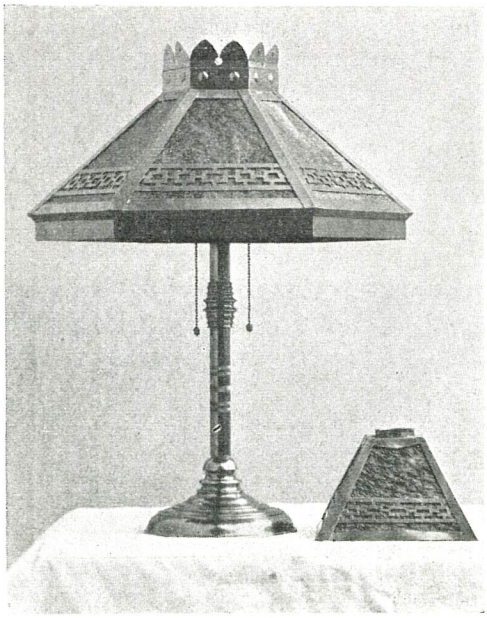


PROBLEMS IN SHEET BRASS AND COPPER.

different small tools will do to carry the work in a class of fifteen to twenty pupils. There is not the same need for individual outfits in sheetmetal working as in woodwork, as the tools can be used in general by all members of the class. The following list may be helpful to those who are about to add sheetmetal to the course of study in elementary work:

1 Squaring shears
1 Forming machine
1 Adjustable folding machine
1 Grooving machine
2 Small burring machines
2 Small turning machines
1 Wiring machine
1 Setting machine
1 Double seaming machine
1 Beading machine
1 Portable lever punch
1 Gutter beader
1 Tinner's 3-ft. steel rule
8 Fire pots (gas or charcoal)
1 Beak horn stake
2 Square stakes
1 Roundhead stake
1 Conductor stake
2 Blowhorn stakes
1 Needle case stake
1 Double seaming stake
1 Candle mold stake
1 Creasing stake
1 Hatchet stake
2 Hollow mandrel stakes
1 Solid mandrel stake
2 Vises
3 Cast bench plates
12 Straight snips
6 Circular shears
12 Rivetting hammers
12 Setting hammers
1 Raising hammer
1 Rivetting hammer
6 24″ steel squares
6 12″ steel squares
1 12″ Wing divider
12 8″ Wing dividers
12 ½″ Wire chisels
12 Small prick punches
12 Small solid punches
12 Steel scratch awls
12 Tinner's hickory mallets
1 set hollow punches
12 Rivet sets, various sizes
2 Pairs cutting nippers 1½″ jaws
12 7″ Flat nosed pliers
8 Pairs 3-lb. soldering coppers
4 Pairs 4-lb. soldering coppers
1 pair 6-lb. soldering coppers
6 12″ Flat files

For an advanced course in sheetmetal a wide range of equipment may be suggested but the work can be carried on with good results with the addition of a few machines consisting of one 4′ cornice brake, one elbow edging machine, one crimping machine, one large turning machine, one band iron brace bender.



Student Work in Sheet Brass.

Development of Water Color in Primary Grades

Martin F. Gleason, Supervisor of Art and Construction, Joliet, Ill.

(Fourth Article)

The Flat Wash and Its Application.

THE painting of flat washes offers excellent opportunity for teaching the properties of color and brush handling. It is a part of the work which permits of much telling, dictating and demonstrating on the part of the teacher, without the slightest danger of doing injury to the child's power of initiative. This step in the development is purely a mechanical process and we may rightly hold children responsible for execution to a reasonable degree. There is danger here, too. Children may very easily get into habits of "scrubbing" unless they are watched closely. Once acquired this "scrubbing" habit is hard to eradicate, so beware of any chance of developing it thru lack of supervision.

In order to acquire any degree of proficiency in painting flat washes, children need a good deal of practice. They will be delighted to do a few of the washes because of the novelty of the process and the attractiveness of the bright color. But soon the novelty will wear off and the interest of the children will vanish, unless we can give some definite application of washes when they are finished. Thru this application, interest may be kept up and the children easily put thru the desired amount of practice. This article will tell of some of the possible applications.

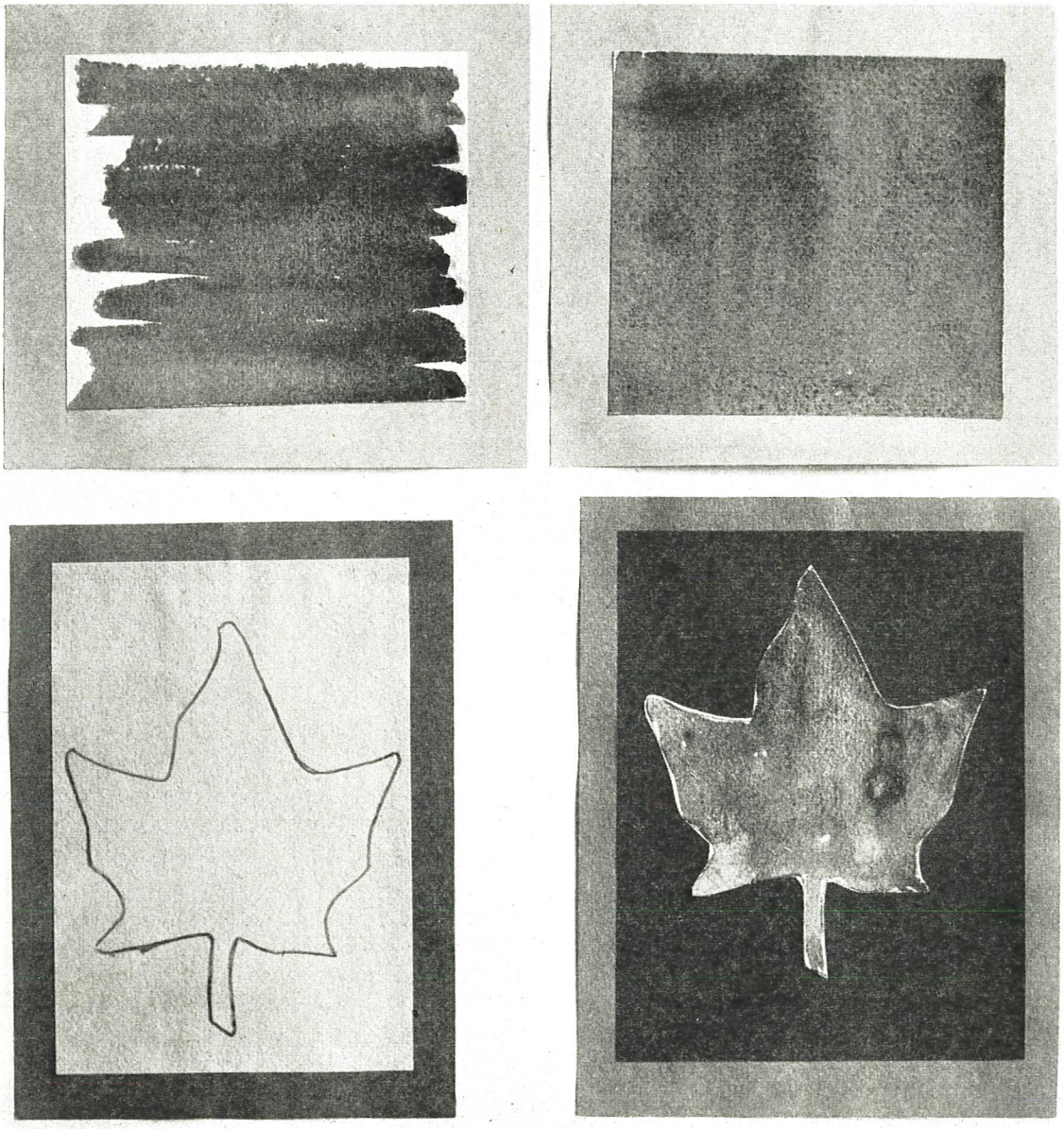


Plate XXII.

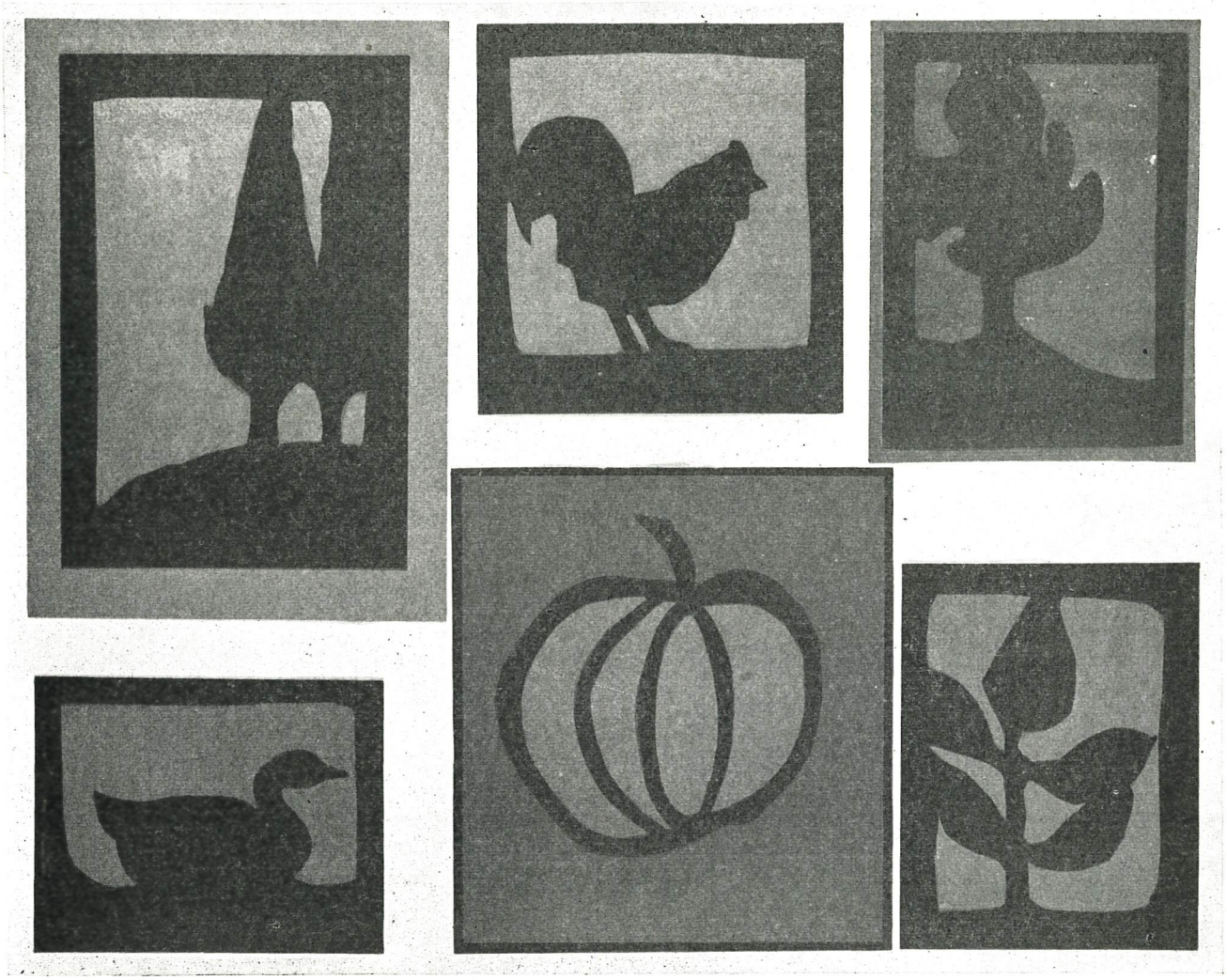


Plate XXIII.

If this work is to be taken up in the first grade a paper of small size should be chosen. The reasons for this are quite obvious—it takes too much time and too much muscular control to cover a large piece. A piece $4\frac{1}{2}''$x6$''$ makes a very good size for beginners. Larger sizes may be used later on.

Have the children find the smoother side of the paper, if possible, and lay it on the desk with this side up. Then show how to bring the brush filled with water across the paper from the upper left-hand corner to the upper right-hand corner. Strive to have the brushes begin just at the left-hand edge and bring the brush entirely across so that this upper portion of the paper is wet from side to side. Try to make each stroke of the brush count for a great deal. Repeat this process over and over until the smooother side is thoroly moistened. Then have the papers turned over with the wet side down. When this has been done take a minute or two to walk about among the children to see if there are any papers which do not lie flat on the desks. If there are and wrinkles seem to appear, show how these conditions may be remedied by lifting the paper up at the side or end, near the seat of most trouble, and pressing them down by moving the hand from the center of the paper toward the edges. If the edges are pressed down they will adhere to the desk and help keep the paper flat. The rougher side should now be moistened as was the smoother side.

The paper is now ready to receive the application of color. The same carefulness in the use of the brush and the same wide sweeps are just as essential here, perhaps a little more so, than they were in moistening the paper. It will be found in an exercise of this kind that some children will neglect beginning at the left edge and will lift the brush before they have reached the right edge, and the result is patches of uncolored paper at both sides. When this is the case, if children are directed to lay the brush down on the oil cloth just to the left of the left edge and brought across the paper on to the oil cloth at the other side, they will soon form the habit of covering the paper completely. Fig. 1, Plate XXII, shows uncolored edges and Fig. 2 shows a good wash.

These washes may be done in any one of the primary colors, or one of these colors may be washed

in over another, making washes of the secondary colors.

Application of These Washed Papers in Other Lines of Work.

Some of these papers which have been washed over with red or yellow may be used in tracing and cutting Autumn leaves. Have the children bring in maple and oak leaves and trace around them with pencils. Then have them cut out and mounted. See Figs. 3 and 4, Plate XXII. These hung along the upper edge of the board will add a pleasing note of color to the room.

Others of these washes may be used in making very effective posters that will bring delight to the heart of primary youngsters. From black paper cut trees with a small bit of land enclosed, with a frame cut in one piece. Paste this down on a paper which has been washed with bright yellow. Trim off any of the color extending out beyond the frame. Leaves, fruits, and animals may be used in the same way. See Plate XXIII for suggestions. The kind of work suggested in the preceding paragraphs may be carried on up into the second and third grades.

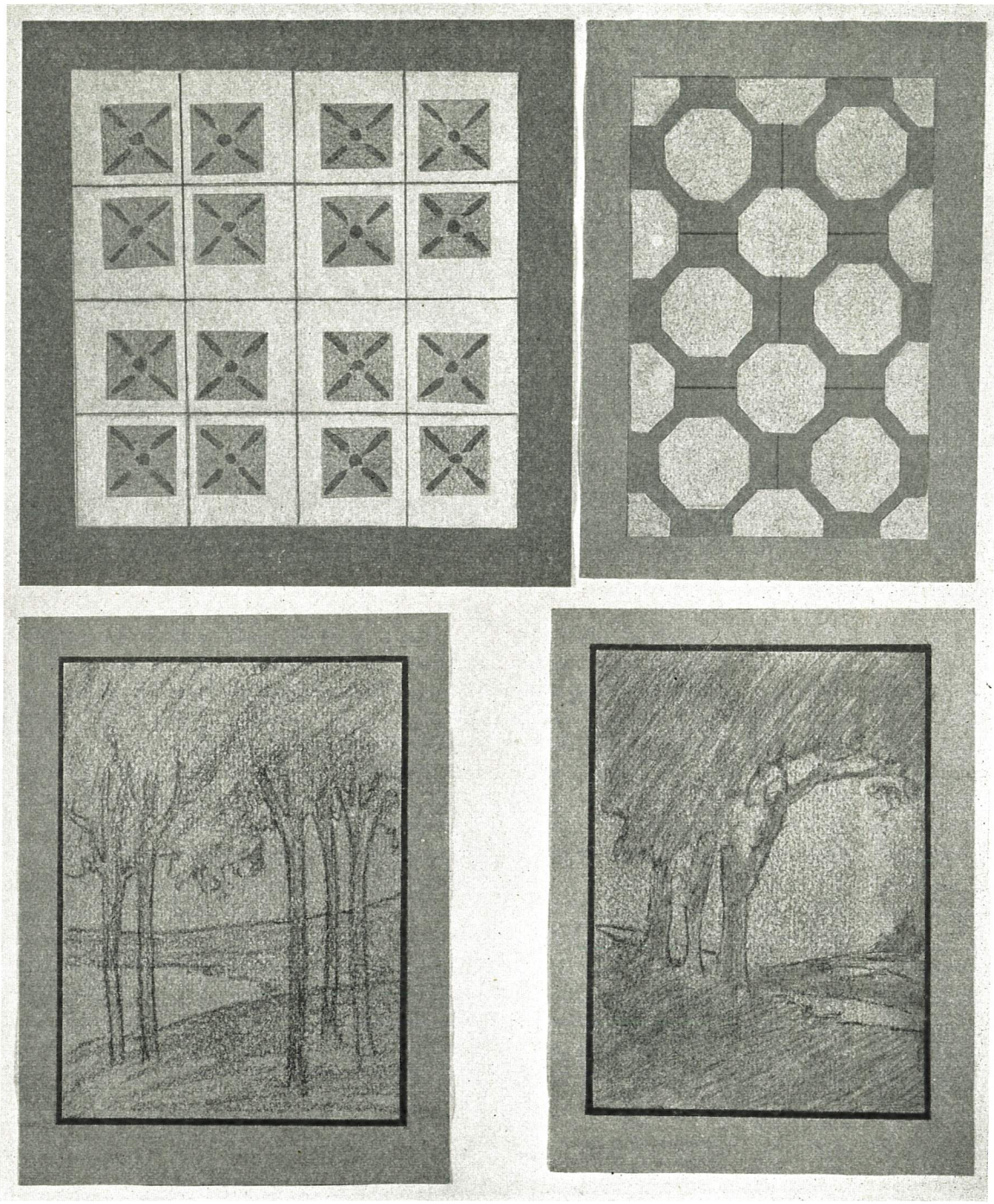


Plate XXIV.

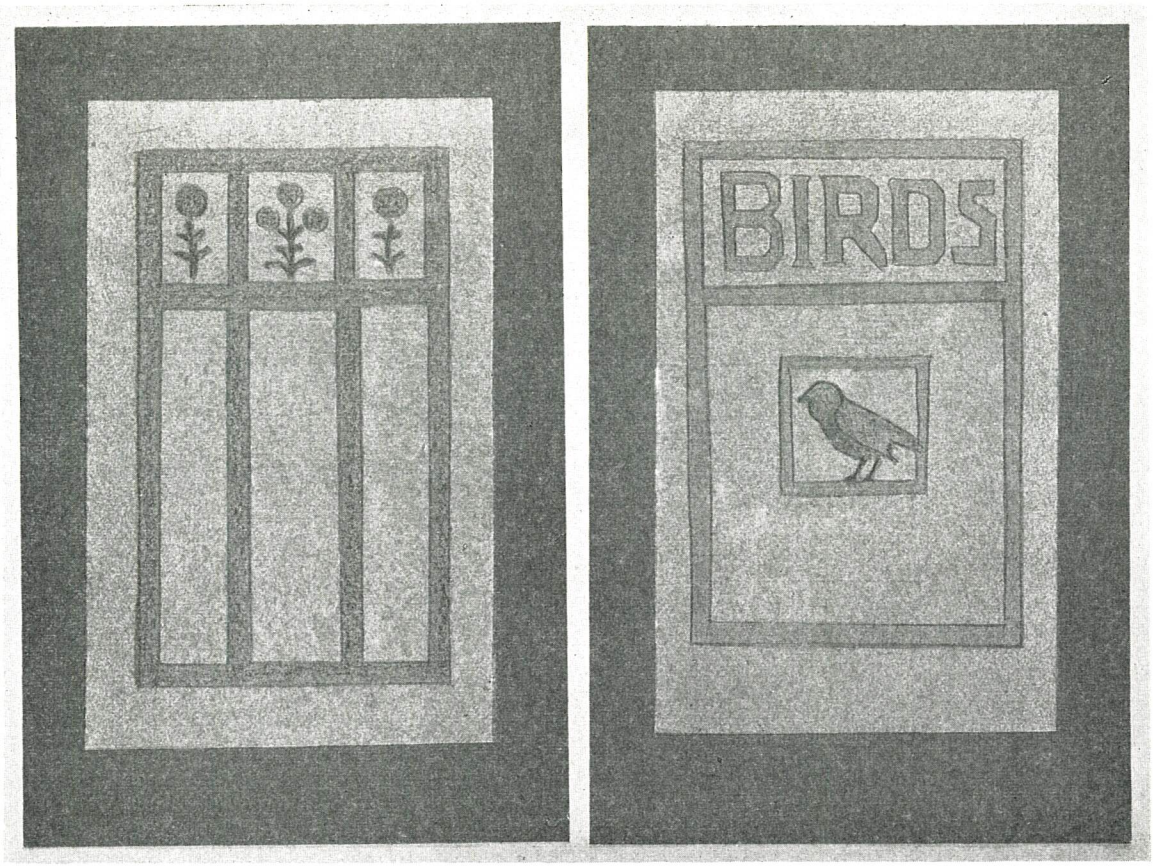


Plate XXV.

If you are working in a place where colored parquetry squares are not supplied have the children make some for their own use. It will not be possible for them to produce the standard colors, or all of the colors which you might buy, but those produced will be of no little value, if properly used. After the papers have been washed with color have them ruled off into squares. If the children are able to use the one-inch measurement have them ruled in one-inch squares. If they have not reached the place where they are able to use measurement, have them use the rulers as straight edges. This process will give squares as large as the ruler is wide. These squares may be used as occupational or seat work as counting material. They may also be used in laying and pasting designs. Figs. 1 and 2, Plate XXIV, shows design made with pasted squares.

Strips for chain pasting may be made from some of these tinted papers. Figs. 3 and 4, Plate XXIV, shows some landscape work in crayon, done on papers tinted in water color. Plate XXV, shows book covers done in the same way.

Do not overwork the flat wash. It is not meant, at all, that any one class should do all the work suggested here, but enough is offered to make it possible to have a choice. Never, in primary grades after the first few lessons, assign flat washes just as exercises, with no application in view. It will not pay either in mental development or visible results. Make your children want to do a thing well because they have a specific use for it when it is well done. When you perceive that interest is lagging drop the work, because when interest lags bad habits of work are formed.

Only the ordinary man is put down and out by ordinary difficulties—the other kind sees in a profitable task only the chance to show what kind of stuff he is made of.

—L. C. Ball.

PRIMARY CONSTRUCTION

Edward F. Worst, Director of Elementary Manual Training and Construction Work, Chicago

NOVEMBER.

Construction Work for First Grade.

The work for this month naturally centers around the history of the first English settlers. In a general way, their wanderings and reasons for the same are gone over in the first three or four grades. The work is rich in offering opportunities for construction in all grades. It will not be necessary for any one of the first four grades to duplicate the work of another.

Cuttings.

Continue cutting from memory and imagination: Puritan men and women, churches, houses, trees, turkeys, canoes, wigwams, boats, wind mills and Indians.

Clay Modeling.

Model such forms as will aid in building a colonial scene,—Puritan men and women, Indians, animals, etc.

Purpose:

To emphasize the history connected with the early colonial time.

To give the pupils an opportunity to use cutting and modeling as a mode of expression.

The following make interesting group problems: Plymouth; the Indian; England, and Holland, and our own country as it appeared to the early settlers.

For the first grade "B" class, a group problem made up of a combination of drawing and cutting of an Indian village affords excellent opportunity for freehand cuttings. The teacher may place on the board or on a large sheet of paper a drawing of a forest along the shores of a lake. The pupils may cut and decorate the wigwams and canoes. These are pasted in appropriate places on the drawing. Cut Indians in action and in repose, and paste. Cut animals and birds.

In the advanced first grade, Plymouth may be built on the sand table, using the folded houses suggested in the outline. Ordinary drawing paper, colored with blue crayon and placed under a piece of glass, makes a good representation for water. Sawdust soaked in a pail of green dye may be used for grass. If there is no opportunity for pupils to get twigs to be used for trees, paper trees may be cut as suggested in the outline.

First Grade.

The folding and cutting combined with the modeling makes it possible to build most interesting panoramas on the sand table.

Boat With Sails.

There will be no difficulty in interesting the pupils in the construction of anything pertaining to Thanksgiving. November is one of the richest months of the year for construction work.

Purpose:

To make as real as possible the history of early colonial times.

To make it possible for the pupils to continue the related number work.

To give the pupils an opportunity to express themselves in good English, in telling about and answering questions pertaining to the construction of the problem at hand.

Material:

A 9-inch square of construction paper.

Presentation:

Present to the class the finished folding of the boat. Pass to each pupil a 9-inch square of manila drawing paper.

Review the number work in the folding of the square as developed in previous exercises.

Fold the diagonals of the square as shown in Fig. 1.

Fold each corner to the center where the diagonals cross.

When the four corners are folded to center, we have Fig. 2.

Reverse the paper so that the closed side is next to you. Fold three corners to the center. Reverse the paper again, holding it so that the unfolded corner points up. Fig. 3. Unfold the lower corner, letting it point downward. Fig. 4.

You will see four corners meeting in the center of the paper. Take hold of the lower two of these corners. Pull them forward and sideward until the corner of the paper which pointed down is drawn up to the center. The lower part of the folding will now assume a boat shape.

Crease along the right and left edges. There are still two corners left at the center of the paper. Fold each of these corners outward, making a crease which runs from the edge of the boat to the upper corner of the paper. The triangles thus formed make the sails.

Fig. 5 shows finished boat.

Color the hull of the boat, leaving the sails the color of the paper.

By this time a considerable amount of small pieces of paper has accumulated from various exercises. Pass to each child smaller squares, allowing them to construct other boats without assistance.

Log House.

The houses constructed by the pupils may be grouped, making an interesting colonial village.

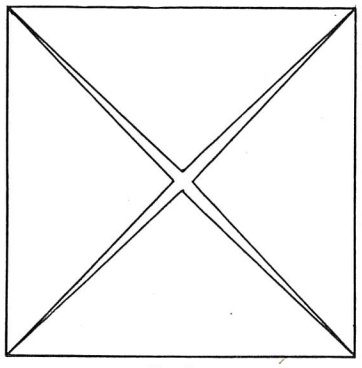


Fig. 1

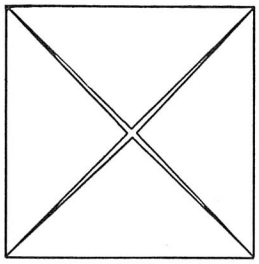


Fig. 2

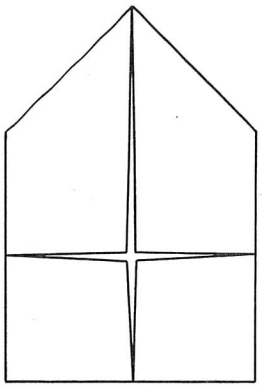


Fig. 3

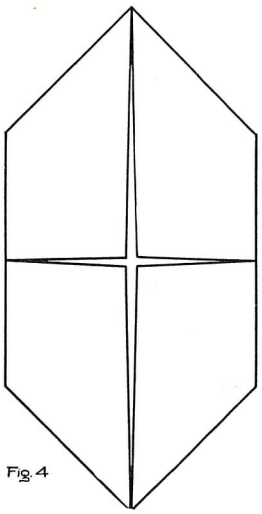


Fig. 4

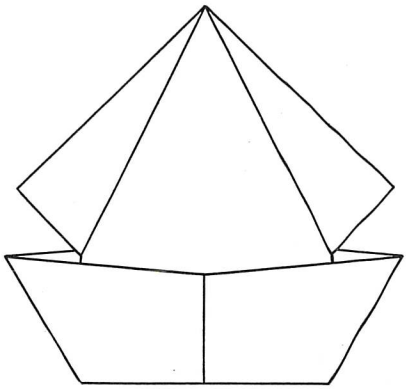


Fig. 5

First Grade.

Purpose:

To add to the interest of colonial history.

To offer opportunity to continue laying the foundation for formal work thru the development of constructive number.

One 9-inch square of construction paper.

One sheet of number paper, 6″x9″.

Presentation:

The pupils have already been told about the felling of trees and the handling of logs in the construction of the first houses. Their interest in the subject makes it possible to construct the little play house which has the appearance of a log house.

Let the pupils understand that the plan is to build up a village of log houses, and that each house constructed is to be placed somewhere in the village.

Fig. 6 shows the folding of a 9-inch square for a house. Cut on continuous lines. Lay square 2 of both front and back rows so it covers square 3, and paste.

Fold squares 1 and 4 so that the cut edges overlap horizontally. Fig. 6A.

Ask pupils to suggest ways of making logs.

A good way to make logs is to take a strip of number paper a little longer than the house and about two inches wide. Roll this strip lengthwise around a lead pencil. Paste is applied to the strip of paper before removing the pencil.

The number paper is used instead of the manila drawing paper, because it is easily pasted. The drawing paper is stiff and refuses to stay when rolled around the pencil and pasted.

To give the appearance of a log the strips of paper may be colored with crayon or water color before rolling and pasting.

These tubes (Fig. 7) are now pasted to the sides and ends of the house as shown in Fig. 8.

Strips of paper one inch wide and as long as the roof may be slashed into fringe-like ends (Fig. 9) and pasted on to the roof, one over the other, giving the effect of a thatched roof. (Fig. 8.) Color strip before slashing.

Cradle.

This is a very simple construction, but of great interest to the pupils.

Purpose:

To give the children an idea of the crude cradle constructed in the early colonial days.

To give opportunity to use good English in telling about the construction of the cradle.

Material:

A 9″ square of construction paper.

Presentation:

Every first-grade teacher knows the joy that comes to a child of the first grade when given an opportunity to construct anything relating to play. Fig. 10 shows folding for cradle.

Cut on continuous lines. Fold and paste as shown in Figs. 11 and 11A. Use the row of squares cut away to make rockers for cradle.

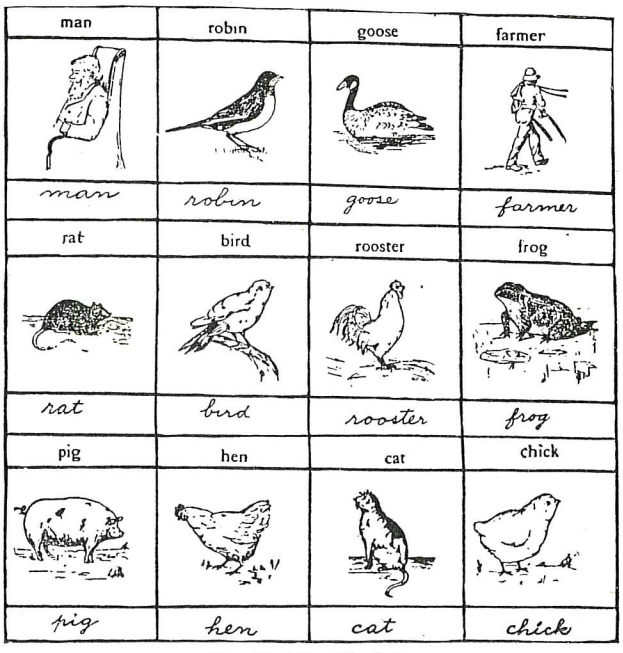


Fig. 21. (First Grade.)

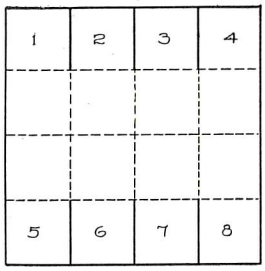


Fig. 6

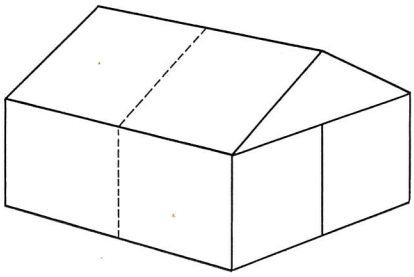


Fig. 6A

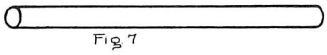


Fig. 7

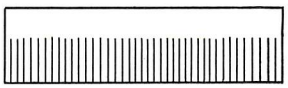


Fig. 9

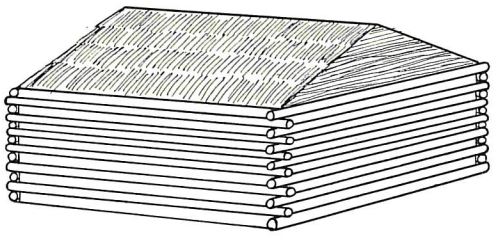


Fig. 8

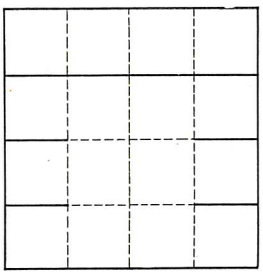


Fig. 10

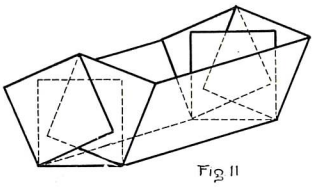


Fig. 11

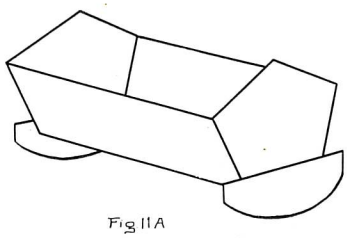


Fig. 11A

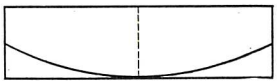


Fig. 12

First Grade.

Fold strip of paper as shown in Fig. 12, and cut as indicated by curved line. Paste rockers to ends of box part of cradle as shown in Fig. 11A.

Review the number work in the construction of the cradle, calling attention to halves and quarters.

After one row of squares has been cut away, a short exercise might be given in combining or counting by threes.

Construction of Church.

The church is to be used in the Thanksgiving work and in the little village built up on the sand table.

It is made of the pyramid, the square prism, and the house, as shown in Figs. 6A, 13 and 14.

Purpose:

To emphasize the Thanksgiving work, and to familiarize the pupils with the square prism and the square pyramid.

To begin to lay the foundation for the furniture for the doll house.

Material for Square Prism:

One 8″ square of manila drawing, or tinted construction paper.

Presentation:

To make the square prism, fold the square into sixteen small squares. Cut away one row of squares and along other continuous lines, as shown in Fig. 10. Fold squares at ends and paste.

Fold, cut and paste another square in the same manner, and fit one box within the other.

Material for Square Pyramid:

An 8″ square of manila drawing, or tinted construction paper.

Presentation:

Fold paper into sixteen small squares. Cut along continuous lines, as indicated in Fig. 13, and fold on dotted lines. When all folding is completed, hold two opposite corners in an upright position, letting the other two fit around the outside as shown in Fig. 14.

By grouping the house, the pyramid, and square prism, we have the church. Fig. 15.

The Church—(Main Building)

Material:

One 9″ square of manila, or tinted construction paper.

Presentation:

Pass paper to pupils, asking them to construct a house the same as in log house.

Trees.

To cut interesting trees to aid in making the sand table complete, take a piece of number paper, Fig. 16, and fold into thirds. Do this by folding 1 over 2, and then both over on 3. Fig. 17. Fold Fig. 17 again, making it one-half as wide. (Fig. 18.)

From the open side of Fig. 18, cut as shown in Fig. 19, and unfold. There are three trees. Crease

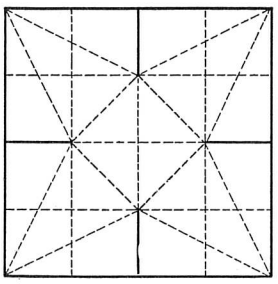


Fig. 13

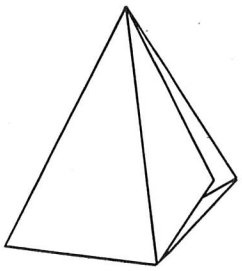


Fig. 14

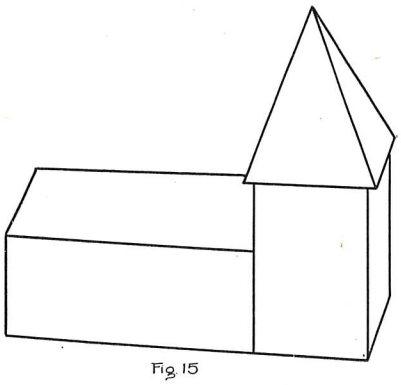


Fig. 15

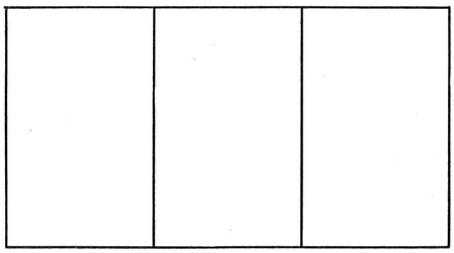


Fig. 16

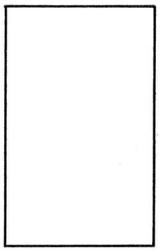


Fig. 17

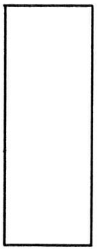


Fig. 18

Fig. 19

Fig. 20

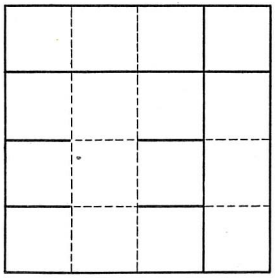


Fig. 22

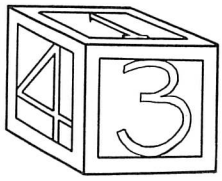


Fig. 23

First Grade.

the middle tree just the opposite to what it is now creased, and let the three trees come together so as to make one tree with a standard. Fig. 20.

By applying paste, the three parts and standard may be pasted together in such a way that it makes a very substantial tree and standard. Color with crayons or water color.

Box for Vocabulary Cards.

This box is constructed the same as former boxes.

Purpose:

To provide a place for the vocabulary cards.

To continue the incidental number work.

Material:

Two 9″ squares of manila, or tinted construction paper.

Presentation:

In the construction of a box and a cover from the same size square, a little difficulty is experienced in removing the cover of the box. For this reason, permit the pupils to cut a strip about $\frac{1}{8}$″ wide, free-hand, from two edges of the square which is to be used for the box. Cutting from two edges continues to keep the paper square.

How to Use the Cards.

If the cards are not provided by the school authorities they may be purchased for a small amount. There are forty cards in the set. Each card has on it a picture illustrating some noun found in the primer. Fig. 21.

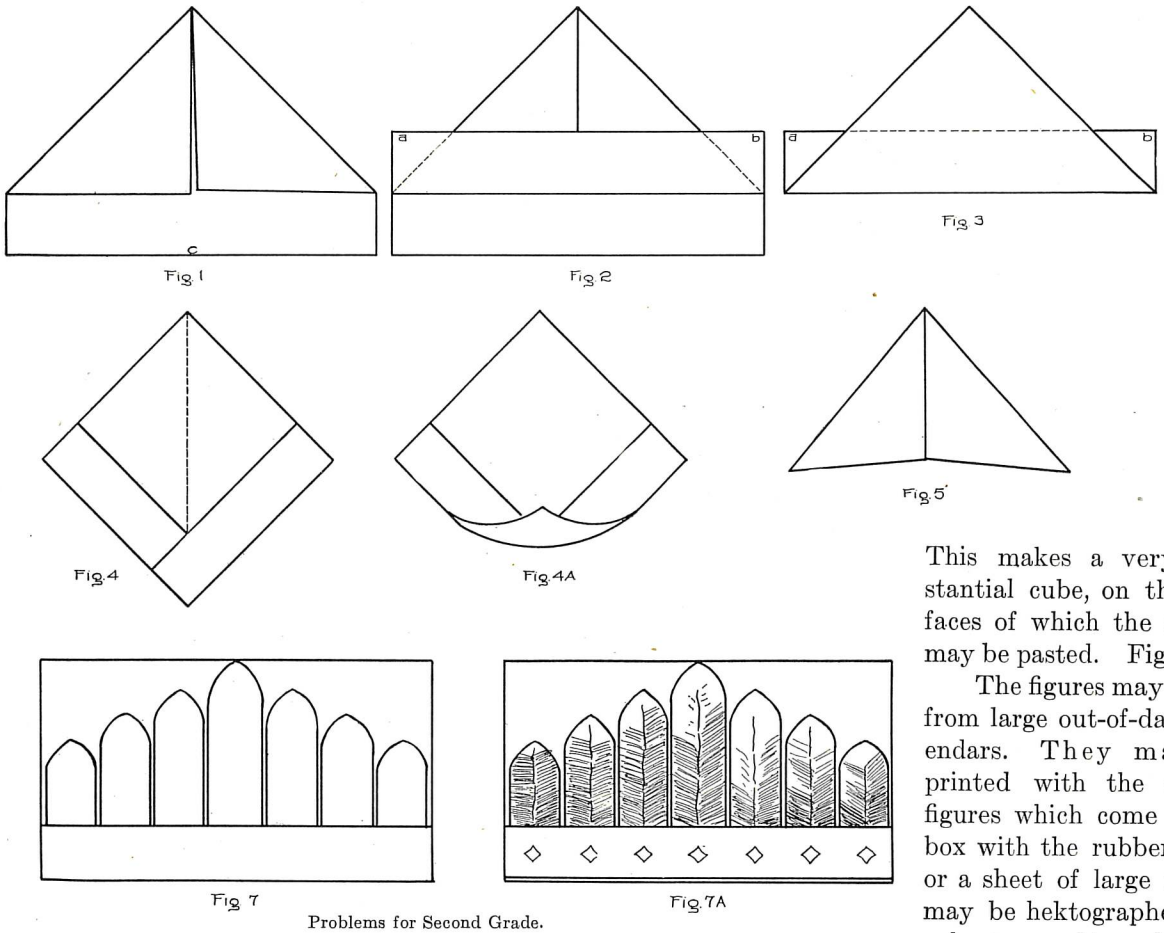
Cut the sheet into separate cards, leaving at first the written word and the printed word attached. This is done so that the child may associate the correct word with the picture.

On a separate sheet may be found the same words in both script and print that are found on the cards. Cut these words apart and match them with the ones attached to the pictures, the print with the print, and the script with the script. Later, cut away the words attached to the pictures. Have the pupils lay the pictures on their desks and then find the word, both script and print, that belong to the picture.

The hektograph may be used in preparing this material.

et	en	ag	an	at	bet	Ben	bag	can	bat
					let	den	fag	fan	cat
					met	hen	gag	man	fat
					net	men	nag	pan	hat
					pet	ten	tag	ran	mat
					wet	when	wag	tan	pat
					get	then	lag	Dan	rat
					jet	wren	rag	than	sat
					set	pen	sag	ran	that

Fig. 24. (First Grade).



Problems for Second Grade.

Number Game.

The construction of this game is based on the cube.

Material:

Two 9″ squares of manila drawing paper or tinted construction paper.

One set of six figures, the sum of any two not to exceed 10.

Purpose:

To provide an interesting way of introducing number combinations thru the game.

To continue simple construction.

To continue to lay the foundation for formal number thru constructive number.

To begin to familiarize the pupils with the simple geometric forms beginning with the cube.

Presentation:

There is rarely a child who does not enjoy making things. Tell the pupils about the game, and something of the way it is played. Show them a finished cube with figures pasted on each of the six surfaces.

Construct the cubes of the two 9″ squares in the following way:

Fig. 22 shows the folding of one of the 9″ squares. Cut along continuous lines. Fold on dotted lines and paste into box form. Repeat same for the second square. Force one box within the other. This makes a very substantial cube, on the surfaces of which the figures may be pasted. Fig. 23.

The figures may be cut from large out-of-date calendars. They may be printed with the rubber figures which come in the box with the rubber type, or a sheet of large figures may be hektographed and a sheet passed to each pupil.

There may be found in the market large figures printed for this purpose at a very small expense.

The Game.

The class is divided into sides. Two pupils, one from each side, come before the class, and when the signal is given, they throw the cubes. The one who can give the sum of the two figures he can see, first, scores a point for his side.

At first the sum of any two figures used on the cube should not exceed ten.

The score is kept on the blackboard by the teacher. The game is won by the side making the highest score.

Envelope for Vowel Families.

Fig. 24 shows a group of vowel families. There are two sets.

Cut on all continuous lines. This leaves a number of long, narrow strips with dotted horizontal lines crossing them. These dotted lines indicate the number of words in each family.

Place all the strips in a row on the top of the desk. As each word is picked up, place it on the strip under the name of the family to which it belongs.

Do not allow the pupils to find all the words belonging to a certain family before beginning another. When this plan is pursued, too much time is spent in looking for certain words.

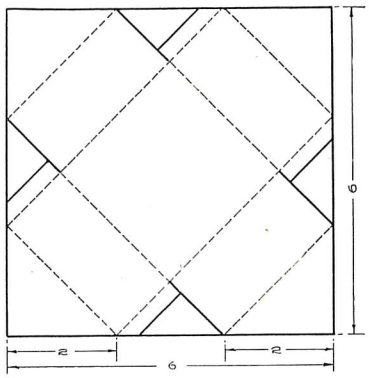


Fig. 8

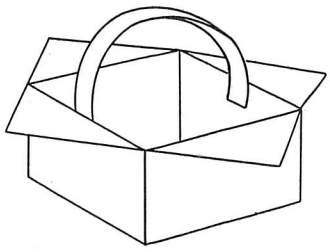


Fig. 9

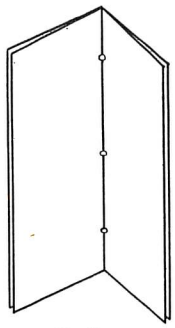


Fig. 10

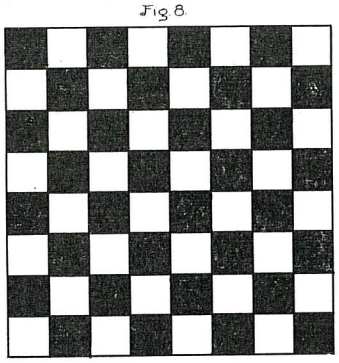


Fig. 11

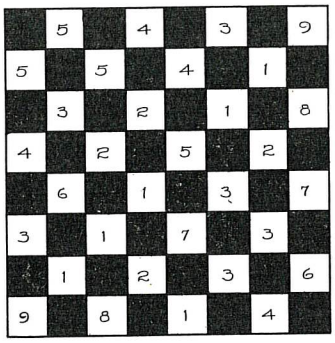


Fig. 12

Problems for Second Grade.

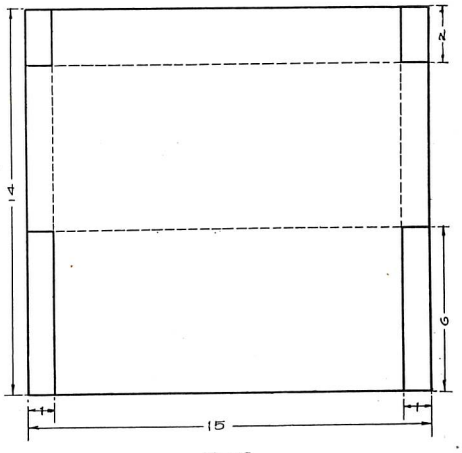


Fig. 13

From the experience gained in previous envelope-making, have the pupils construct from material furnished, an envelope into which the various parts of the game may be placed.

NOVEMBER.

Construction Work for Second Grade.

Free-Hand Cutting.

No month of the year is richer in opportunity for cutting and tearing than the month of November.

Choose some particular part of the history for this month and have the children illustrate, thru cuttings, the happenings of the time. Holland is a good subject, as it affords great variety.

A strip of wrapping paper or ingrain wall paper may be placed across the entire front blackboard. This may be used for the cuttings, as they may be arranged and pasted on it. The fact that it is large will prompt a freedom in cuttings. Cut Dutch homes, wind mills, cows, boats, etc., and arrange to make a Dutch scene.

If the teacher so chooses, the paper is long enough to let one end represent the American shore and the other the English, with the ocean between. Cuttings pertaining to England may be pasted to one end, and those pertaining to America to the other end. The Mayflower may be cut and placed in the ocean.

Puritan Cap for Girls; Soldier Cap for Boys.

Purpose:

To interest the pupils in the early mode of dressing.

To make real the history of the Colonial days.

Material:

One piece of paper 9″x12″. This may be a piece of newspaper. To make full-sized cap use a piece of paper 18″x20″.

Construction of Cap:

Hold the paper with short edges at right and left. Fold right and left edges together. Hold paper with creased edge at top. Fold right and left edges together. Unfold. Find crease thus formed.

Fold right half of upper edge to this crease; left half. Fig. 1. Fold front oblong at bottom upward along front edge of triangle; back oblong upward along back. edge of triangle. Fig. 2. Fold

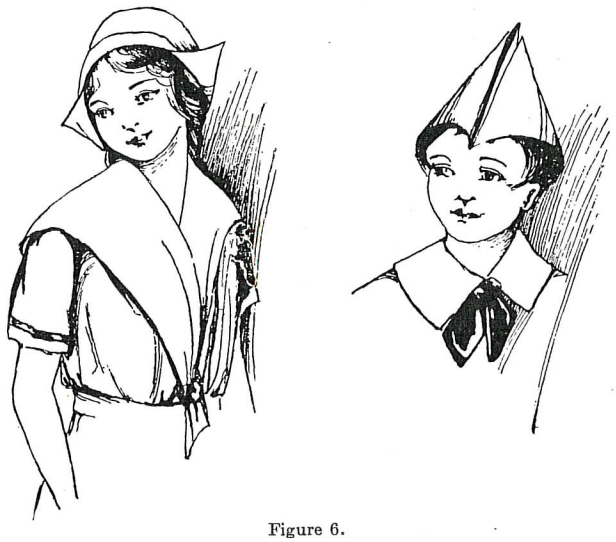


Figure 6.

corners at "a" down, one over the other, at "b." Fig. 3.

Hold paper by middle points "c" of lower edges. Pull until square is formed. Fig. 4. The folding at this point makes a fine cap for the girls, as in Fig. 4A.

To finish the soldier cap for the boys, fold lower corners "d" upward and outward to upper corner "e." Spread at the bottom to fit the head. Fig. 5.

A very interesting kerchief may be made for the girls by folding three cornered a plain white paper napkin. For the boys, cut a sailor collar out of the napkin. Fig. 6.

To make the Indian head-dress, fold and cut a piece of stiff paper as shown in Fig. 7. Color the feathers with colored crayons as shown in 7A.

Basket—(Thanksgiving).

Purpose:

To give the pupils pleasure.

To create a desire to do for others.

Material:

Tinted construction paper.

Candle wicking, carpet warp, macrame cord, jute, or any other sort of cord may be used for tying corners.

Presentation:

It is usually customary for the pupils, on special days, to celebrate by having a program, or some little affair that might suggest a party. On this occasion, have the pupils of the second grade make and give to the pupils of the first grade, little baskets in which popcorn or candy may be passed.

Construction of Basket:

Show to the class a complete basket. Have the pupils suggest various uses for the basket. Place on the blackboard a pattern drawing as shown in Fig. 8.

Pass paper and have them construct by reading pattern drawing.

If all lines to be folded in any exercise are first lightly scored and then folded, the results are more finished.

Cut handle about $\frac{3}{8}$ of an inch wide and 7 inches long. Since the pupils measure only in half inches, cut the handle 7 inches long and $\frac{1}{2}$-inch wide. A narrow strip may now be cut from the handle free-hand, thus reducing the width to $\frac{3}{8}$ of an inch. Fig. 9 shows finished basket.

Original Basket.

Pass the necessary material to the class and have a basket constructed according to each one's own ideas.

Spelling Blank.

To aid the child in keeping systematically the words learned for the month.

To give the child an appreciation of his own power in constructing the simple blank books.

To lead to more difficult work as he advances.

Material:

Five 5″, 5$\frac{1}{2}$″ or 6″ squares of number paper or unruled language paper.

One 6″ square of tinted construction paper.

One piece of carpet warp of desirable color, 14″ to 16″ long.

One darning needle. (Needles may be borrowed of third grade.)

Presentation:

Children enjoy the elementary book-making, especially when the teacher is enthusiastic. They see the reasons for the book construction. The parents can see a reason for it.

Pass to each child five squares of unruled language paper and one square of tinted construction paper. Fold each sheet into halves. Place them one within the other, placing all the white sheets in the colored cover.

To Sew the Book:

First mark the center of the crease down the back by a dot. Fig. 10. Two inches above and below this dot place other dots. Thrust the needle thru the entire book at the places the dots appear. With the needle threaded, bring it thru the center hole from the outside to the inside, leaving an end of about four inches. Bring the needle thru the bottom hole from inside to the outside. Next, with one long stitch, bring the needle thru the hole above the center to the inside of the book. The needle next passes thru the center hole a second time, but this time it is from the inside to the outside. There are now two ends at the outside of the book. One end should be at each side of the long stitch. Tie a hard knot over the long stitch. The ends may now be tied into a bow knot.

Plan very carefully some simple decoration for the cover. Cuttings or the stick printing may be used.

Number Game.

Purpose:

To give the pupils practical experience in a construction of practical value; and to give them opportunity to use the half inch.

To provide a simple means of getting simple abstract number.

Material:

One piece of 12″x12″ manila document paper.

One piece of 6″x12″ tinted construction paper.

One strip of bookbinder's cloth 1″x12″ (to be cut at the school). Library paste.

Presentation:

Present to the class a finished board. A general talk explaining its use will add greatly to the constructive interest.

Pass to each child a piece of tinted construction paper 6″x12″. Place dots along the edges 1$\frac{1}{2}$″ apart. Connect corresponding dots by straight lines. Cut on the lines just drawn, dividing the sheet into 1$\frac{1}{2}$″

squares. Place the squares in the cutting envelope until ready to paste them to the board.

Pass to each child a 12-inch square of manila document. Place dots $1\frac{1}{2}''$ apart on each edge. Connect the corresponding dots by straight lines. Beginning in the upper left hand corner paste a colored square to every other square marked on the board. We then have the board as shown in Fig. 11. Figures as shown in Fig. 12 are placed in each blank square.

To make the board easily handled, it may be cut thru the center and the two halves pasted together with a strip of bookbinder's cloth 1″x12″. This acts as a hinge and the two halves may be folded like the covers of a book.

Cut a small disc about the size of a twenty-five cent piece, and the board is ready for use. Fig. 12.

Use of Board:

Each child with his note book and pencil may make combinations by copying the figures in the squares touching diagonally. Forty-nine combinations can be made, giving repetition of many of the 25 combinations:

5	5	5	4	4	3	1	will be taken from
5	5	4	4	3	1	9	the first and sec-
—	—	—	—	—	—	—	ond rows. See Fig.
10	10	9	8	7	4	10	12.

By using the disc a game may be played very much the same as a checker game. The disc is moved from one figure to another diagonally, making an example in addition with each move. For example if a start is made by placing a disc on the five in the upper left hand corner of the board, and is moved to the next five, an example is the result which is written:

5
5
—
10

Moving from the 5 to the 3, we have 5
3
—
Moving from 3 to 4, we have 4 8
3
—
7

Any number of combinations may be had by moving diagonally first in one direction and then another. It is true that each pupil's set of examples is different from that of any other in the class. The game is to see how many examples each one can get during a period of seat work. The game is one in which each pupil may work to break his own record. If, during one period, he is able to get but 20 combinations, he will aim to get more the next period. He may also work to get the most of any other in the class.

The exercise is a valuable one if conducted as suggested above. Each teacher, no doubt, will discover other ways the board may be used.

Purpose: *Envelope.*

To provide a way of keeping the number board.

To give exercise in reading a pattern drawing from the blackboard.

Material:

One piece of 15″x20″ kraft wrapping paper.

Library paste.

Construction of Envelope:

Before beginning the construction of the envelope, the teacher and the class should discuss the problem and the material to be used. Fig. 13.

How long must the envelope be? How wide?

Why is kraft paper better than drawing paper?

Why is it desirable to make the envelope of paper of a dark color?

NOVEMBER.

Construction Work for Third Grade.

Cutting and Tearing.

This month is as rich for the third grade in freehand cutting and tearing as it is for the first and second grades.

Across the top of the front blackboard place a piece of wrapping paper or ingrain wall paper. Use this as a foundation on which to mount the cuttings to be used in building up a Thanksgiving poster. A group problem of this sort makes it possible for each member of the class to be represented, for the larger cuttings may be placed in the foreground, while the smaller ones may appear in the background. Emphasize pine trees. These may be used in a New England forest. At least half of the strip of paper may be used as land, the other half as water. Cut Indians, wigwams, canoes, Mayflower, Pilgrims, Plymouth Rock, animals, and anything else which may seem of interest.

Soldier Cap and Puritan Bonnet.

If the teacher so desires, it might be well to make use of some of the work as outlined for the second grade for this month. Children of the third grade enjoy being Indians and Pilgrims, so will thoroly appreciate the simple construction suggested for the second grade.

Purpose: *Puritan Cradle.*

To aid in getting the pupils interested in Colonial history.

To give practice in reading and working from a pattern drawing placed on the blackboard.

To make something to be given to some younger child.

Material:

One piece of tinted construction paper 9″x12″.

Presentation:

Present to the class a finished cradle. Fig. 2. After discussing its construction place before the pupils a pattern drawing (Fig. 1) from which they should work.

How long is the drawing? How wide?

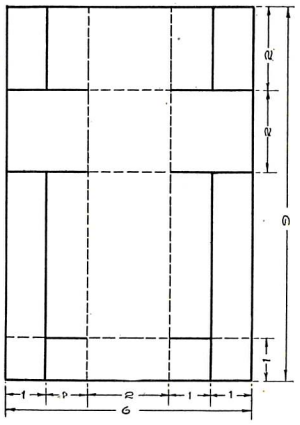


Fig. 1

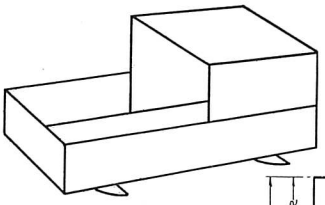


Fig. 2

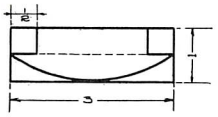


Fig. 3

1	2	3	4	5	6	7	8	9	10	11	12
2	4	6	8	10	12	14	16	18	20	22	24
3	6	9	12	15	18	21	24	27	30	33	36
4	8	12	16	20	24	28	32	36	40	44	48
5	10	15	20	25	30	35	40	45	50	55	60
6	12	18	24	30	36	42	48	54	60	66	72
7	14	21	28	35	42	49	56	63	70	77	84
8	16	24	32	40	48	56	64	72	80	88	96
9	18	27	36	45	54	63	72	81	90	99	108
10	20	30	40	50	60	70	80	90	100	110	120
11	22	33	44	55	66	77	88	99	110	121	132
12	24	36	48	60	72	84	96	108	120	132	144

Fig. 5

1	2	3	4	5	6	7	8	9	10	11	12
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											

Fig. 4

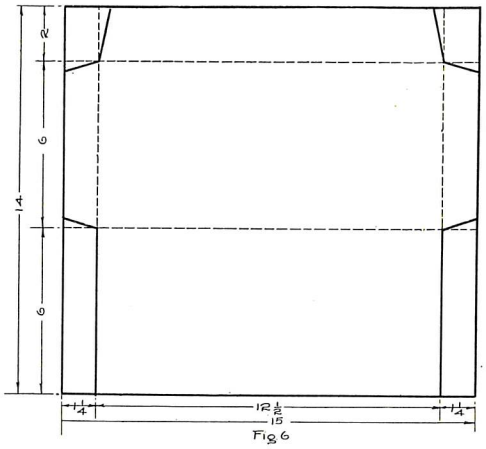


Fig. 6

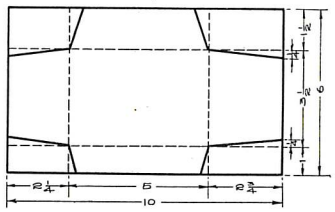


Fig. 7

Problems for the Third Grade.

How much longer is it than it is wide?

What is the length of one long edge and one short edge put together?

What is the distance half way around the pattern drawing?

What is the distance all around (perimeter)?

Fig. 3 shows drawing of rocker.

Multiplication Game.

This game, while listed as one problem, is really made up of four problems,—the number board, envelope to hold number board, board for multiplication table, and the small envelope to hold the $\frac{3}{4}''$ squares.

Purpose:

To teach the pupils to do neatly and accurately a simple ruling exercise which leads to more accurate work in the mechanical drawing of the higher grades.

To give the pupils a practical lesson in construction, emphasizing the number element.

To provide a way for a drill in the multiplication tables to be used as seat work.

Material:

1 piece of 12″x12″ document.

1 piece 9″x9″ manila document.

1 piece bookbinder's cloth 1″x11″.

Presentation:

The child should know the multiplication table perfectly, and this game is an excellent help in mastering it. The making of it furnishes the best sort of seat work.

If at this time the pupils are not familiar with all the multiplication tables, use the game only as far as the pupils are able.

The 12″ square of manila board is ruled into 1″ squares. This is done by placing dots one inch apart along the right and left edges, and then connecting the corresponding dots by straight lines. Dots are then placed on the front and back edges and the corresponding dots connected by straight lines. Fig. 4.

In the upper horizontal row of squares, write the figures from 1 to 12. In the vertical rows of squares write the figures 1 to 12, using the upper left square for each 1. Fig. 4. In order to have this a convenient size to keep in the desk, cut the square into halves, and paste together with a piece of bookbinder's cloth. It can then be folded to a 6″x12″ rectangle.

Multiplication Table.

Rule the 9″ square into $\frac{3}{4}''$ squares by placing dots $\frac{3}{4}$ of an inch apart on the outer edges and connecting corresponding dots by straight lines the same as in Fig. 4.

Write the multiplication in this form, using the 144 squares. Fig. 5.

In order to familiarize the children with the table before using it for silent work, read it by horizontal rows and by vertical rows. Compare the first row, either vertical or horizontal, with the other

rows, and the other rows with the first row; e. g., the sixth with the first would give 6 is 6 times 1; 12 is 6 times 2; 18 is 6 times 3; etc. Or, 6 times 1 is 6; 6 times 2 is 12; 6 times 3 is 18.

Comparing the second with the fourth would give this: 2 is one-half of 4; 4 is one-half of 8; 5 is one-half of 10; 6 is one-half of 12; 8 is one-half of 16; etc., or, 18 is 3 times 6; 24 is 3 times 8; etc.

When ready to use for seat work, cut off the upper and left row of figures on the 9″ square, as they correspond with the figures on the large square. Cut the rest of the square into its small squares, and write number of each title square on the back as it is on the front. This makes it easier to handle the game.

The object of the game is to place the small squares in their proper places on the large square in the shortest possible time. For example, if the child picks up a small square containing the product 24, it must be placed in the square under 6, opposite the 4 at the left.

If he picks up a product of 32, it is placed under 8, opposite 4, or in the square under 4, opposite 8.

When trying the arrangement the first time, let each child note the time it takes, and make a note of it. After a few days of practice take time again, to see how much has been gained. Let each child have for his aim to beat his own record rather than that of someone else.

It may take more than a half hour to place all the products the first time. After a couple of weeks, the time is sometimes reduced to six minutes. The exercise affords excellent drill in number.

Envelope.

Purpose:

To hold the number board.

To give the pupils an opportunity to read and follow a pattern drawing.

Material:

One piece of kraft paper 14″x15″.

Have a class discussion of the various ways the envelope might be constructed, and the color and texture of the paper. Why is kraft paper better than the manila or gray drawing paper?

Place Fig. 6 on the blackboard, and have pupils construct from drawing. The drawing on the blackboard should be large enough to be seen from all parts of the room.

How long is the pattern drawing? How wide is it?

How much longer is it than it is wide?

How wide are the paste flaps?

How long and how wide is the flap that will cover the opening at top?

Small Envelope.

Purpose:

To hold $\frac{3}{4}$″ squares on which the multiplication tables have been written.

To give pupils an opportunity to construct an envelope based on previous experiences.

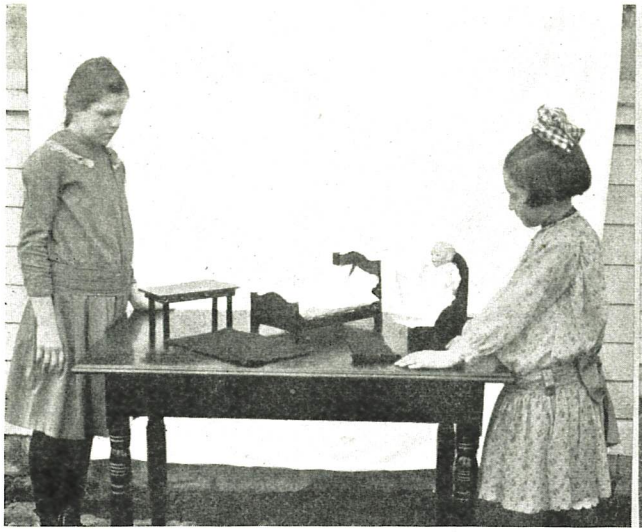
Material:

Use manila paper such as was used in the construction of the large envelope.

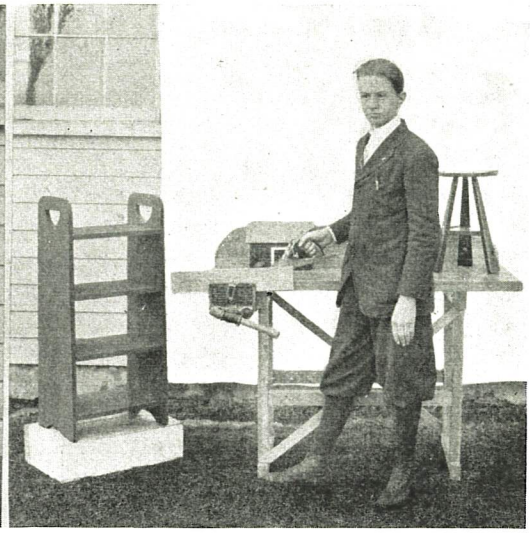
Presentation:

Pass to each child a piece of kraft paper. After a few general remarks on the construction of envelopes, ask the pupils to construct as large an envelope as possible from a 6″x8″ piece of paper. Fig. 7 shows pattern drawing.

THE simplest things in life are hardest to grasp, because the ordinary mortal is forever overstepping the natural and easy way, reaching in the most complex and different manner for results that he makes difficult of attainment by not simplifying his effort.—*The Artisan.*



Doll Furniture and Clothing.



Furniture made by a Pupil.

HANDWORK IN A RURAL SCHOOL

Hazel Hartzel, Pine View School, Franklin Grove, Ill.

PINE VIEW, District No. 54, in Lee County, has, by experience, learned the actual value and importance of a course of handwork in the rural school. For the past two years a complete outline of construction, manual training and sewing in all the grades has been successfully worked out along with the regular academic course as prescribed by the state course of study.

Paper folding, cutting, card sewing, drawing, modeling and weaving receive special instruction in the first and second grades, and are carried out thru the advanced grades according to the needs of the respective grades.

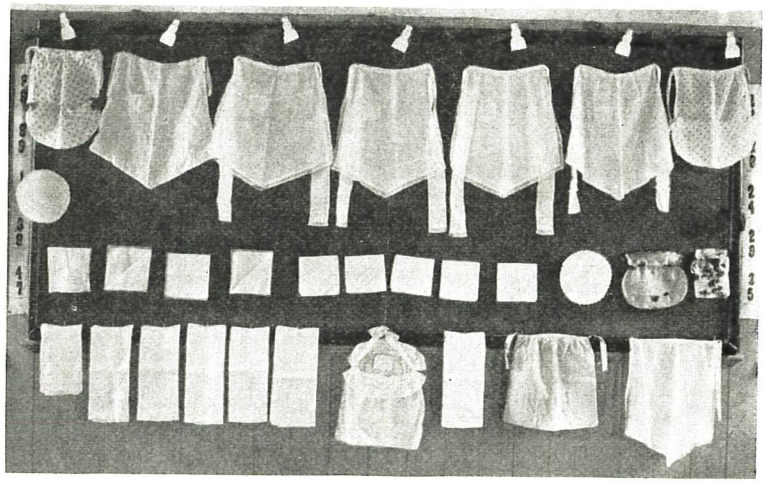
The third grade, at present, are making toy furniture, using 3/16″ basswood, while the eighth-grade boys are making such pieces as book racks, tabourets and magazine racks, and other articles of use in the home or about the farm.

In sewing, the third grade has had the exercise of stitches and, after making several little pieces, are now making little slip-over aprons in full sizes, while the eighth-grade girls are making their graduating dresses.

The time devoted to this individually is one-half day per week, altho the first three grades receive some instruction every day, as a part of their daily program. If pupils of the other grades have completed their left-over work satisfactorily, they are privileged to work at their manual training. In no way have I found this work interfering with the regular academic work. On the other hand, it acts as an incentive to more accurate, thoughtful study and to better recitations.

Our aim has been to have the work self-supporting. Two years ago, our school board saw the value of the work on a small scale and decided to give us twenty dollars to invest in tools and apparatus, suited for larger things. Since then the work has entirely supported itself and netted each child a saving, for Pine View won $35 at our County Fair the first year and $75 last year, which gave us a neat little sum to begin work with this fall.

There is no question whether the pupils enjoy this manual work. They do. They are interested and over-anxious for the weekly half-day to come, when they know they will be working in earnest. They plan for their work and original ideas are not uncommon. With this splendid attitude toward the work, and delight in it, school life becomes a joy to the teacher instead of a drudgery.



Sewing Exhibit.

As a rule, the parent's interest is aroused and in every case and at all times, every parent, rich or poor, has been willing to do all he or she could to aid the work. We also find that those district residents who do not have children in school, are greatly interested and are looking after the welfare of the school in various ways. Co-operation is the greatest working power in the schoolroom and this work affords one of the greatest opportunities for co-operation.

The influence of such training on the regular bookwork is beneficial to say the least, and the home life is not exempt from its beneficial influence. Most of the boys have shops at home where they work out original ideas. The mothers delight in telling how efficiently, and with what pleasure, the girls assist them with their work at home.

Small Articles made n the Author's School.

PLAYGROUND APPARATUS AS A PROBLEM

H. R. Porter, Dayton, Wash.

THE accompanying drawing and photograph represent a simple problem in construction that teachers of manual training in small schools may perhaps be able to utilize with profit for group work. As a means to insure new interest and an excellent co-operative spirit it possesses a value not found in any individual project.

The larger share of the work was done by the beginning high school class, tho the second year boys lent a helping hand at times, and one of them prepared the working plan. Usually one boy was placed in charge as foreman, since the work could not always be supervised.

In our case the school playground space, tho ample, was unadorned with play apparatus, unless a disused tennis court could be so termed. The only other open space had become, naturally, a limited base ball diamond, too small to tempt the larger boys, and furnishing exercise and play to only a small number of the younger ones, while the vast majority stood and "watched." Our first step away from these conditions was to transform the "ball park" into three courts, two for basket ball and one for volley ball. The basket ball courts were placed end to end, the central 6″x6″ post supporting two baskets, with their backstops. The play on one court seldom interfered with that on the other. The posts for the goals and also for the volley ball net were placed in concrete.

There was then left to us a rather narrow strip of ground lying between the tennis court and the walk, which suggested the combination of traveling rings and swings. All of the supporting timbers of this unit, both uprights and horizontals, were 6″x6″ and the braces 4″x4″. The uprights were set four feet in concrete. The method of fastening the overhead beams to the tops of the vertical supports is clearly shown in the drawing, to render explanation unnecessary. The long iron pin driven thru both at first, held them in place while the iron corner braces were bolted.

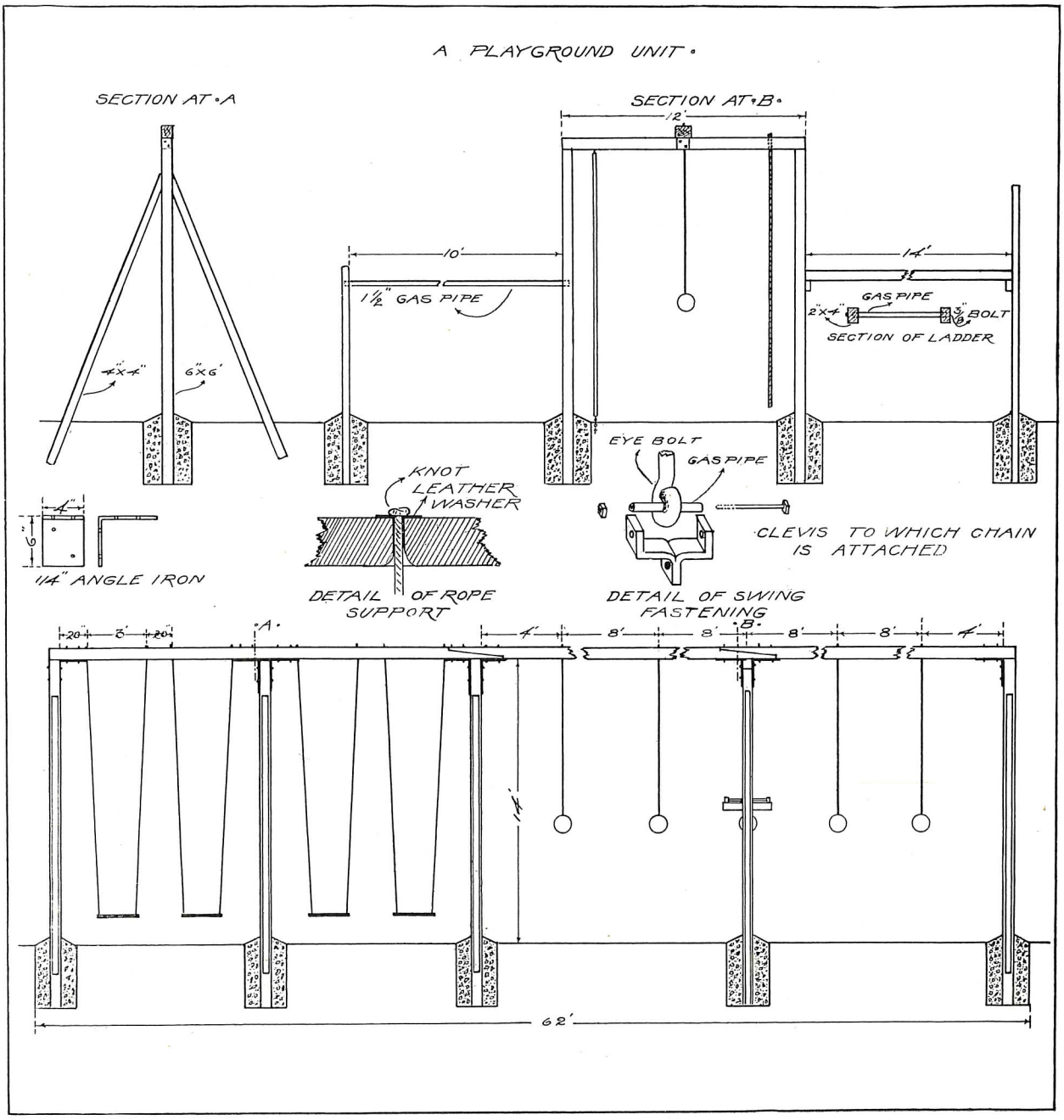
The 8″ traveling rings of $\frac{5}{8}$″ iron, one third covered with leather, were suspended by one and one-fourth-inch rope, which, as shown, passed thru the 6″x6″ and was held by a knot and a leather washer. The lower edge of the hole was slightly chamfered, and the rope as yet has shown no evidence of wear.

More care was taken with the swing supports, in order to reduce to a minimum the cutting tendency of iron. Thru the eye bolt that fastened to the overhead beam, a 3″ piece of gas pipe was placed, and from it hung a clevice, kept in place by the bolt which passed thru the gas pipe. Halter chain formed the swing material. These swings have required not the least repair, and seem to be in constant motion.

A climbing pole and rope proved very popular, and took very little space. The over-head ladder consists of sections of gas pipe, housed halfway into the sides, which are of 2″x4″. Thru the two end pipes and the center one are long bolts, well washered, which keep the rounds snugly in place.

The total cost of this equipment, including the iron work and the material for the basket ball goals, was about $40.

The Playground of the Dayton, Wash., School. Apparatus made by students.



INDUSTRIAL-ARTS MAGAZINE

EDITORIAL

MAKING SUCCESS IMPOSSIBLE.

IF we may rely on the reports that come from manual training teachers in some of the smaller high schools, there are conditions in the manual training departments of such schools that are almost beyond belief. An instance will suffice to make clear the situation complained of.

In one case, the manual training instructor is required to offer five two-period electives in manual training, but is not permitted to set definite hours for recitations. Each boy who elects a course is permitted to go to the shops at the hours in which he has no other work. The result is that at any time during the whole day, there are students working in benchwork, turning, forging, printing, and machine shop practice, with but one instructor trying to attend to all the work.

We can scarcely imagine the confused state of mind and the sense of utter helplessness that must come to one working under such impossible conditions. It would seem that an instructor could make it clear to those in authority that it is impossible to accomplish anything under such an arrangement. Indeed, had we not had so extended and varied experience, we scarcely could believe that there are school authorities who know so little and care so little about satisfactory working conditions for successful manual training work as is indicated by the case in hand.

Yet it is not an uncommon thing to hear manual training held up to censure because it "hasn't made good!" May it not be just possible that very many of the so-called shortcomings of manual training are due to the ignorance, the neglect, and the inefficiency of those who act in administrative capacities?

SOME CONCLUSIONS ON DRAWING.

AFTER several years of experiment in the teaching of drawing in the Elementary School of the School of Education of Chicago University, Walter Sargent and Elizabeth E. Miller have published a book—"How Children Learn to Draw." The authors come to three conclusions which should be suggestive to those who are considering drawing in relation to school work. Experienced drawing teachers will find verification of their conceptions in these conclusions. School executives may well be guided by them in their inspection of drawing instruction.

These conclusions are not new or startling. In fact they have been stated many times by advocates of drawing as a school subject, but the conclusive evidence of the results of an extended experiment such as Mr. Sargent and Miss Miller have made should convince some skeptics that the subject should be used to enrich school work that is now presented in a dry and formal method.

The first of these conclusions is: *"Interest in telling something is the motive which inspires all good drawing."*

To the drawing teacher this conclusion points to the necessity of developing a lively intelligent interest in the object to be drawn.

To the teachers of other school subjects it suggests the use of drawing to define and clarify conception as a process of instruction.

The second of these conclusions is: *"Industrious drawing directly from objects unaided by other sorts of study and practice has not proved to be the most effective way of learning to represent them."*

The recognition of this fact has revolutionized drawing instruction in the most progressive schools. A good drawing is no longer considered as the exact imitation of a form in proportion, tone and texture. A good drawing is always the expression of an impression in terms by which it may be recognized. These terms are never the exact terms of a particular natural example. The operation of drawing is as much mental as manual.

This idea is becoming established in the minds of drawing teachers, but to the person who has not drawn, the subject is still conceived as a routine of manual drill for dexterity. With this conception of drawing and the method of instruction which it warrants, drawing becomes a matter of constant selection and arrangement of lines, tones and forms to express impressions. Who will say where drawing instruction leaves off and art instruction begins? The best drawing instruction involves in large measure the same selective practice and mental conception as art instruction. Indeed, *the best drawing instruction is essentially art instruction by direct application.* Those who would eliminate drawing from our school curriculum and replace it entirely with exercises in design may well consider the above conclusion and its result upon drawing instruction.

The third conclusion is: *"Progress in ability to draw is not general but specific."*

In other words, we may not give practice in drawing one particular thing and expect it to give skill in drawing everything.

Again let us remind ourselves that a drawing is the record of a mental impression and it is only in so far as we can develop vizualization that we can

teach drawing. The vizualization of one form may not aid in the vizualization of an unrelated form. Types must be committed to mind. Forms are classified and related in the mind of the draftsman so that the controlling forms of objects become a part of his mental equipment. This much can be accomplished by school drawing properly taught.

UNWISE ECONOMIES.

DURING the past summer, Peoria, Ill., added its schools to the list of those who, when somewhat pressed financially, decided to drop out of the system the supervisor of drawing and the supervisor of manual training in order to reduce expenses. Last year a few other schools tried this same ill advised plan, and we have heard of some other towns that have done the same this year. Peoria is the largest town that we know of that has tried the experiment. The method of operation in this instance was particularly unfair to the persons whose positions were discontinued. Both went on their vacations with no intimation that their positions were not permanent and were notified late in June of the action of the school board. At the same time they were assured that their work had been highly satisfactory and that the board regretted the necessity for the economy.

It is hardly believable that a city with the wealth and industries that Peoria has is compelled to cripple its school system by these methods. If the school finances are really in such condition, it would seem that there must have been gross mismanagement somewhere. With the liberal allowance of taxation which the Illinois law permits for school purposes, it is incredible that this sort of practice is necessary.

If the policy of retrenchment was necessary, why were these particular positions chosen for elimination? It is in this question that teachers of industrial arts are particularly interested. Why didn't the school board decide to operate the schools without a superintendent and save his salary also? If the town is poverty stricken, why was not a general reduction of all the salaries made? Surely the superintendent and teachers are reasonable and if such a sacrifice is necessary, they would be willing to bear their share of the burden, rather than to have the schools crippled by eliminating heads of two such important departments.

Such economies are in the same category as purchasing eye glasses in the ten-cent store in order to save the fee of an oculist.

It is strange after so many years of manual training and drawing in the schools that any group of school officials should look upon these subjects as luxuries to be dispensed with in times of financial stress. If board members are uninformed in regard to the function of drawing and manual training in the schools and the value of this work not only as subjects of themselves, but as methods of teaching other subjects, it is the duty of the superintendent to inform them. It is his duty furthermore to protest vigorously any movement which will lower the efficiency of the schools. No school official is justified in depriving that group of children which is now in the schools of an educational advantage which children who preceded them and those who are to follow them are to enjoy. If this work is a fad or an unnecessary expenditure of public funds, there can be no justification of it in the schools at any time. We cannot believe, however, that any school superintendent in a progressive city so looks upon manual arts work in the schools.

There are some elements in the situation described above which will bear thoughtful consideration. If the school boards and superintendents who thus cripple the work of these departments are acting in good faith, is it not possible that the department heads have not sufficiently demonstrated the value of their work in the schools? The lesson for supervisors is to make themselves and their work indispensable in the schools and not to be too modest in letting the public and the school board know the value of their work. While the advertising may require some time which might be advantageously devoted to school work, at the same time the value to the community of thus educating its adult population will more than offset this. Furthermore, the first requisite of good teaching, insofar as the teacher is concerned, is that the teacher have a position.

AND SO DIVORCE INCREASES.

"THE Home Harmonious" is the title of a department in one of our large city dailies. Under this department title we read a discussion of *"the origin of a 'delightful' and 'original' fad indulged in by 'leading home decorators.'"*

Anita de Campi, the department "editoress," tells us that time was when useless portiers hung between openings. Then came an *"eminent foreign decorator"* whose original genius suggested putting hooks on the door frame and hanging draperies on the hooks. According to "Anita" this was a great success because it was candidly *useless* and "exposed the falsity of the preceding draw-curtains that were never drawn."

Then comes the final stage of evolution which Anita de Campi commends highly. She states that the "factor of decoration is now supplied *directly upon the door frame with painted ornament instead of ornamental fabric.*"

But this precocious, creeping, evolutionary painted ornament is not satisfied with its place on the door frame, and Anita tells us that the panels and the window jambs and even the ceiling beams offer *points of vantage for "touches of painted ornament."*

So does Anita fill three columns of our daily paper with advice which any housewife may follow on how to make the home harmonious.

Wage Worth of School Training for Girls

Considerable discussion has been aroused by a thesis written by Dr. Anna C. Hedges of Columbia University on the "Wage Worth of School Training for Girls," (Wage Worth of School Training. Contributions to Education, No. 70. By Anna Charlotte Hedges. 173 pages. Price, $2. Teachers College, Columbia University, New York City.)

The author has made an analytical study of the preliminary training, and the subsequent employment and advancement of six hundred women in textile industries. The particular one of her conclusions which has aroused opposition is as follows:

"The factory field, which today receives the school girl as a wage-earner, makes definite demands upon her if she is to become a progressive earner. These demands are inherent in the nature of present day factory organization which has departed from trade methods and now requires accuracy, speed and specialized machine operating. Trade schools for the majority belong to the past when preparation for trade was needed. Operations can be learned in from a few hours to a few weeks and are best taught in the factory whose special methods and machines are not adapted to school conditions. Factory work must be a wage-earning field for the majority of grammar school girls because of the numbers and medium ability required."

The author states that the result of her inquiry has been to turn her from her prior position as an advocate of "*trade training for girls, whose training must be limited to the grammar school, to the viewpoint of more and better education for all grammar school girls.* By more and better *general* education is meant—acquaintance with the meaning and use of English words; knowledge of how to keep well; ability to control thought and action; dexterity in the use of tools and materials in the preparation of foods and the making of clothes and familiarity with processes required in the care of garden and home."

The conclusions which Miss Hedges reaches after this exhaustive and painstaking study are not to be regarded lightly. Since the age of 17 she has been a wholly self-supporting wage-earner thru her highly disciplined skill in fine arts and handicrafts; has had many years of public school experience as a teacher; was Director of Household Arts at Pratt Institute; for some years was the Director of Hebrew Technical School for Girls in New York City; and now holds the degree of Doctor of Philosophy from Columbia University. It is quite apparent that it required considerable evidence to change her from an advocate of specific trade training for girls to the one which she now holds.

Her study has led her not only to criticize present methods in general education, but to take serious exception to popular conceptions of industrial education and present methods of administering it. She states:

"Industrial education has been directed largely in this country by school men and women whose contact with the industrial world has not been immediate, and plans formulated by them for industrial and technical training have been determinated more by what it seems theoretically boys and girls should have as preparation for wage-earning, than by analytical study of workers' work and work conditions."

In a review by Katharine Anthony, published in the New Republic of August 12, 1916, under the caption "Unindustrial Education," we find the following:

"A book which aims to discourage the specific vocational education of girls and women offers very untimely counsel at this particular season. Events were never less auspicious for decrying the value of technical training for women wage-earners. At this moment vast numbers of women are plying the most highly skilled trades of the most highly skilled nations of Europe. In both England and Germany the movement for vocational training for girls has gained new momentum during the past twelve months. In this country, many states are laying the foundations for a system of industrial education in connection with the public schools. It is short-sighted from every point of view to set forth any program which would exclude girls from the influences which make for skill and technique.

"The principal recommendation of Miss Hedges' study is a negative one. She sets out with the purpose of learning what factory requirements should influence the education of girls for industrial life. Her main conclusion is that school training for specific operations is not necessary. The girl wage-earner needs only to receive 'Instruction in English, in hygiene, and in dexterity.' The result of the author's inquiry—and here we must credit her with candor if not with foresight—was to change her 'prior position as an advocate of trade training for girls whose schooling must be limited to the grammar school to the viewpoint of more and better general education for all grammar school girls irrespective of their career beyond the elementary school.'

"She sees no hope for this situation in the development of industry. She accepts as ultimate and unchangeable the progressive subdivision of labor, the infinite multiplication of unskilled processes, and the complete segregation of women in the crude, repetitive branches. With a certain enthusiasm of hopefulness, she proposes that, as human work can never again be humanized, the patient should at least be made as comfortable as possible. 'If she has interests of an intellectual or artistic nature, she will fill her outside time to her own advancement. This will react on her attitude of mind while at work during the day, make it possible for her to do the repetitive work at the machine sustained by the feeling that, when the day is over and the product of her labor piled up in the basket beside her or credited in her account book, she can get the variety which her tastes and ideas in life demand.' In other words, the author sees no possible integration between school and vocation.

"The book is for the most part made up of intricate and ingrowing statistics which lead nowhere. A more unhelpful contribution to the problem of the vocational education of girls has seldom been made. Besides, it may be actively harmful to an extent not even desired by the author in that it encourages those who, all along the line, are ever ready to hamper the vocational effectiveness of women. The fact that the book was written by the state agent for the vocational education of girls helps to lend importance to its contents. One might reasonably expect from these sources a more discriminating view of the industrial relations and the educational needs of the girl wage-earner."

The criticisms of the book published in the August number of the Journal of Home Economics by Mrs. Mary Schenck Woolman are also worthy of considerable attention. Mrs. Woolman has had many years of experience in trade schools and in the preparation of her review has consulted the heads of well-known trade schools, leaders in the trade world, and a group of makers of statistics.

"In her advocacy of the elementary school as a better preparation than the trade school for working in textile industries (including industries such as the electric operating garment trades), she has in mind and describes an ideal education not now to be found in the usual public school. Undoubtedly if the elementary schools were of this character or likely soon to become so, and if the children could be kept in attendance until graduation there would be little need for trade or vocational schools of the elementary type, as they were organized largely to make up for the defects of the elementary school.

"It is not probable in this generation that the better class of elementary education will be found except perhaps in a few aspiring places. The impossibility at the present time of keeping the majority of children in the schools makes necessary the organization of trade or vocational training that these crude young workers may have a chance in life. In addition the majority of girls of fourteen coming into industry have been found to be too young and immature to 'select wisely and follow skillfully' any occupation even when 'careful preparation' has been given them. They need more specific training before the trade is a good place for

them. The elementary school can guide them, but preparing them at this early age for industrial success is a more difficult matter. The trade school has proved to be a significant step for them toward better wage-earning ability —the young worker is too apt to have many slack seasons and this time has been well utilized in the classes of the trade schools.

"It is true that the factory itself should be the ideal place to train young workers, but, as yet, the worker-teacher seldom understands how to benefit each pupil by her teaching beyond a mere added skill at a machine. She should so train these girls that they would be able to fit into other similar trades by giving them a foundation of knowledge of the trade and facility in taking up new problems and not mere speeding on one machine. It is difficult for a worker to consider the development of the girl as more important than the rapid completion of the product. The time will come undoubtedly when the bridge between the skilled worker and the skilled teacher will be crossed, but, at present, the factories are not well equipped for the education of young workers. The trade unionist is alarmed at such short methods of training and feels the benefit attained is for the employer rather than for the girl—her small added wage is not all that is required to give her the chance in life she should have.

"In a short review it is impossible to indicate the many points where there is room for opposing views. The book is full of positive statements and deductions which are at variance with the findings of many of those who are giving their lives to vocational education and of those interested in giving a 'chance' to the working girls, and of makers of statistics. 'Industry is so specialized today, and promises to be much more so in the future, that preparation for any operative line seems time and money wasted' is asserted without the accompanying fact that the trained worker is tending away from specialization. 'Trade schools belong to the past.' 'The best trade schools cannot approach factory conditions,' and 'Trade schools are expensive' are statements which have strong contradictory arguments.

"There seems no evidence that the writer consulted leaders in trade school work or trade unionists for their points of view and yet they are in more close contact with the problems of the wage worth of school training than are those who were consulted to obtain statistics."

It is quite evident that Miss Hedges has opened up the entire question of trade training for girls and it is apparent that there is room for wide differences of opinion upon the subject. An answer to the questions raised is fundamental to the development of any successful scheme of industrial education for women in America. Some points of agreement must be established before any advance in the training of girls is possible. No better methods can be devised than that of studies and investigations such as Miss Hedges has made, and the comparison of her conclusions with those of others who have had similar experience and have made similar investigations.

The *Industrial-Arts Magazine* would welcome a full and complete discussion of this perplexing problem in its columns.

A NEW COMMUNITY PROJECT

V. M. Reppert, Director of Manual Training, Russell, Kansas

The general trend of interest these days is toward something that will benefit the Community. Democracy is taking a practical turn and much is being done that is giving it a new life and interest. The biggest step was made when the work was directed into the lines of benefiting the community instead of just a few. There is a common need that every one feels and when it is met by giving to the poor at the same time that others are benefited, it takes away the stigma of charity and makes all equal sharers.

Russell, like many of the smaller towns all over the country, had for some time felt the need of both a gymnasium and an auditorium, but what was "everybody's business was nobody's business," so nothing had been done. A few years ago there was an agitation for a gymnasium but the time was not ripe. Since then the school enrollment had increased and the town grown so that such a place was a necessity. For the season of 1914-15 the basketball team had used a room above a store to play in, but in many respects this was unsatisfactory and it was about settled that the room could not be rented again at any price. There was no other place to go and the problem had already become acute.

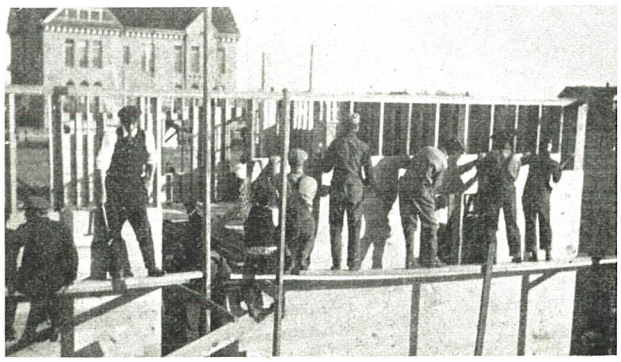
About this time the Fort Hays Normal School of Hays, Kansas, sent out a bulletin telling of a small, temporary building which had been put up by the manual training classes of the high school and which was being used for a gymnasium.

As I had charge of the athletics as well as the manual training, I knew about what the boys could and would do. I went before the Commercial Club of the town and put before them the proposition of a small building to be erected by the boys on the city park lots, the material to cost in the neighborhood of $700. There were only two objections made and no one felt injured by them. The plans were too small and not enough money was asked. They wanted an auditorium and a stage, as well as a gymnasium.

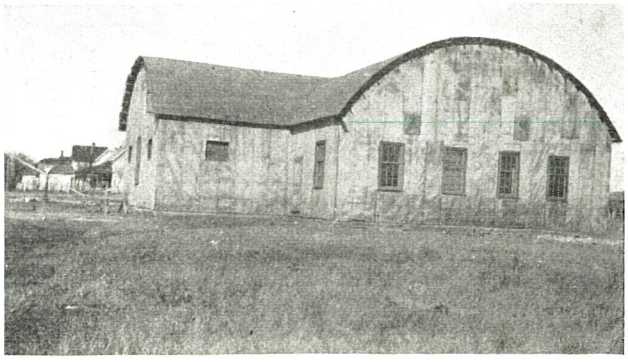
They took immediate steps to raise the money by means of selling shares in the building at $5 a share with a mark of $1,500 in view. In a short time the money was pledged and, I might add, payment of the entire amount was prompt.

We appealed to the department of architecture at Kansas University for help in the plans, but as they had no appropriation for such a purpose, they could not help us and we had to take up the burden, as we felt unable to pay an architect's fee.

Plans were drawn for a T-shaped building, the main part to be 42 feet by 72 feet and the stage wing to be 20 feet by 36 feet. The roof was to be a circle roof, built on a 25-foot radius, and the stage 2½ feet above the main floor.



Nailing on Siding—Labor Holiday. The High School Building is in the Background.



The Completed Community House.

This gave room for a basketball court 28 feet by 56 feet, and when used as an auditorium would seat at least 500 people. The stage and the space around the basketball court give ample seating room for the games. The cement for the foundation was poured last Thanksgiving Day and 42 days after that the boys were playing their first game in the building.

As it was to be a frame building of only one story, the foundation was not laid very deep. The joists and bridging went in rapidly and the framework was soon up. Then a labor holiday was given the high school and the boys nailed on siding while the girls prepared and served dinner. It was a great day. Each class was assigned one side of the building and there was a lively contest to see which could get thru in the shortest time. After dinner the girls helped the young carpenters and exploded that old fallacy that a woman can't drive a nail straight and keep from mashing her fingers.

But the biggest task remained. The building and putging in place of the big roof supports, which were to span 42 feet, was a problem carpenters unused to even seeing big buildings were a little afraid of. A model was constructed of lath, each lath representing a timber 2x8x24, a scale of two inches to the foot. This model weighs a little less than five pounds and will support a weight of three hundred pounds.

The parts were all sawed in the manual training shop and taken outdoors to put together. As inexperienced carpenters it was hard to have faith enough in our plans to do this but every piece fitted in its place. A pole and block-and-tackle were used to raise them into position and there was a general sigh of relief when each support settled into place and fitted exactly.

The roof was made by bending ship-lap to follow the curve and then covered with rubberoid. The sides are also covered with rubberoid, a temporary measure, until there shall be more time and money to put on a gravel roof and regulation siding.

When the floor was to be laid another class contest was held. The three boys whom I considered the best workmen in each class were put under the direction of an older man, and a three-hour contest held one night with proper rooting and encouragement by the other members of the classes.

Soon after the work was started the City Council had connection made and high power electric lights put in. In that way we were able to work at night and our regular day's work consisted of the time from noon until midnight with time off for supper. As I had my manual training classes in the afternoon we were able to follow this schedule very nicely. Our big mistake was in starting just as winter was coming on, but we did not want to wait, so we went ahead. Much of the time it was so cold that we worked with two suits of clothes, rubbers, and mittens to keep us comfortable. New Year's Eve we had a watch night "flooring party" and that practically finished up the work. About a week later the delighted boys played their first game in the building and won.

The building is owned by the city and stands on city property. A board of control is appointed by the Commercial Club and the Cosmos Club, the women's club of the town, three from each organization. The work has been done by the manual training department with the help of the three men on the high school faculty, four of the ministers of the town, and various men who contributed a day of labor whenever they were able. The labor is easily worth $1,500, so the town has a building worth $3,000 in cash and many times that in influence. It has been named Community Hall and the effort is to make its name real.

It has been used for class parties, class plays, socials, games, and entertainments. It is open to any organization for any proper use they wish to put it to. It belongs to every one because the people who bought the shares want it that way. It has stimulated all lines of endeavor, athletics, dramatics, music, play. During the severe weather, Saturdays were designated as play days for the children of the town when they played under the direction of teachers. Hand ball, volley ball, indoor baseball and tennis, as well as basketball, may be played, so there is practically no limit to the play uses to which the building may be put. Best of all, it has given the town something to boost as a whole. It has brought all factions together and made them one, and it has made the town worth more to the surrounding farming community. We know that it is worth much to us all.

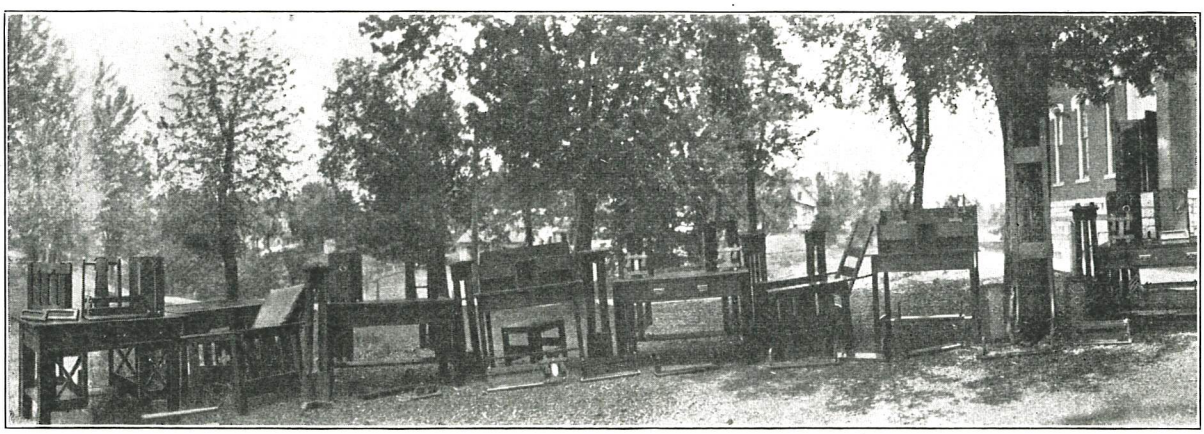
THE INDUSTRIAL ARTS IN ILLINOIS.

Of 324 high schools which reported for the year 1915-16 to Prof. H. A. Hollister, high school visitor of the University of Illinois, 159 offered some form of manual training. In 129 schools woodwork alone was taught. A total of 11,825 students were enrolled in manual arts courses and of these 8,434 are recorded as taking woodwork; 1,029, forging; 1,305, machineshop work; 265, printing.

Fifty-one high schools have one-year courses in manual training; 78 have two-year courses; nine offer three years of work; and fifteen report full four-year courses. On the basis of individual registrations 14.76 per cent of the total high school enrollment takes manual training.

Domestic science is taught in 175 Illinois high schools accredited to the university, but returns are so imcomplete that figures of enrollment could not be compiled. There is evidently no uniformity of opinion as to the length or character of domestic science courses or their proper place in the high-school program. The courses range in length from one semester to six semesters. Fifty-one schools permit the work to be taken during any of the four years; twelve limit it to the third and fourth years; 31 permit it only during the first and second years; eleven offer it in the second and third years, and 38 make other combinations of time allowance.

In speaking of the enrollment of students in departments of art and design, Mr. Hol ister writes: "Only 109 schools report work as offered in this department. Twenty of these are Chicago schools. The reports given are not of a suf-



A YARD OF MANUAL
Made by Students of the Greenfield, Ill., Grades and

ficiently definite character to admit of a statement of the number taking the work. In the main this work is confined to the larger high schools.

"It seems unfortunate that so small a number of high school pupils should have opportunity to find themselves in this mode of expression. There have been, at times, an inclination on the part of some critics of the public schools to class this work among the 'fads.' When we consider its numerous applications in practical arts it is certainly a matter for regret that so little thought is given to art and design and its applications. This country needs more people skilled in the applications of freehand with the different media and of design. We need it in decorating homes, in landscape decoration as well as in recording things observed in travel or in the study of nature. We need it also in poster work, cartoons, and illustrative drawings for books and magazines.

"Above all do we need in more of our people that appreciation of beauty in form and in harmony of colors, as these occur in nature and also in the decorative arts. And it is thru such an educational department in our schools that such appreciation is most likely to be awakened and developed."

CO-OPERATION IN ART EDUCATION.

In a recent circular addressed to the art teachers of New York State, Mr. Royal Bailey Farnum, Specialist of the State Department of Education, urges teachers to seek local co-operation to make their departments more effective. He suggests that a teacher should, in every possible way, study the lives of the pupils and of the people. He should get in touch with all local civic and social agencies which make for, and which can in any way, co-operate in a general or specific way for art education. He urges especially that the local library, museum, women's clubs, civic betterment clubs and business organizations be called upon for help thru a committee of the art department or thru other means which the teacher can effect. Among the specific forms of co-operation, Mr. Farnum suggests:

1—School exhibits may be held in the library, museum or town hall.

2—Exhibits of town conditions to show possibilities of improvement may be held and studied by both pupils and clubs, with a talk for the combined groups. These exhibits may be photographs.

3—Camera pictures may be exhibited showing progress in civic beauty. Prizes may be offered.

4—Special exhibits of old furniture, glassware, tableware, lighting appliances, fans, jewelry, costumes, embroidery, laces, textiles, such as shawls, silks, cretons, etc., and many other articles of general interest may be gathered from the homes of the townspeople and exhibited in the school, the library or the museum. Where there are no museums, a beginning may thus be made toward the establishment of a permanent storehouse of this kind for educational purposes.

5—Exchange exhibits may be made with neighboring towns.

6—Traveling exhibits from the country's great museums may be held and the interested groups may hold special days for the study and discussion of these exhibits.

So by means of public exhibits in school and out, talks and lectures, clubs, competitions and the general exchange of ideas, the school work may come in contact with the community. Thus local pride can be stimulated and co-operative effort may do much toward creating a desire for a more beautiful environment. Both parents and pupils may unite on a common ground of everyday art to the great advantage of the school art work. The search for the common application will soon lead to higher ideals and a search for more knowledge of the fine arts.

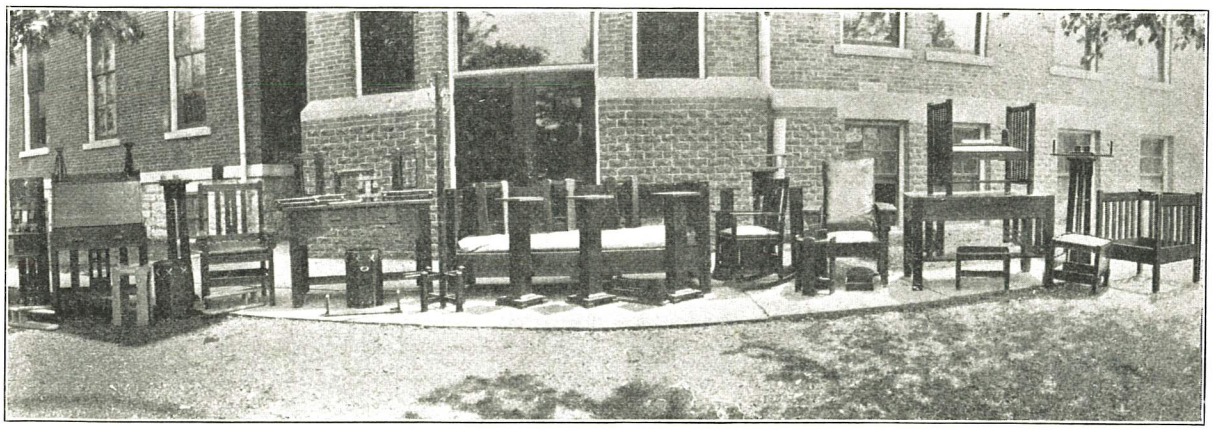
In addition to the foregoing, there should be a close relationship with the school. Athletics, social affairs, the school grounds and the interiors usually offer many ideal opportunities for putting the drawing into actual practice. Finally, other subjects may in themselves offer a means of enriching the art course. For example, the elements of beauty in design have a similar meaning and application in music and in literature. The history of the early peoples is also a history of their arts and the sciences must have their place in the study of art photography, ceramics and painting. Mathematics is fundamental in mechanical drafting.

DR. HAAREN DIES.

Dr. John H. Haaren, associate superintendent of schools in New York City, who has been prominent in developing the New York vocational and continuation schools, died suddenly on September 23rd. Dr. Haaren entered the New York school system in 1880 as a substitute teacher and after five years' experience, became principal of Public School 76, Brooklyn. The next year he was transferred to School No. 10, which was then the largest school in the city. William H. Maxwell later appointed him an assistant superintendent, and when Greater New York was formed transferred him to Manhattan.

During the past six years he has been in charge of the continuation schools, the co-operative corporation schools and practically all vocational education activities not included in the Garyized schools.

Johnstown, Pa. The second year of printing for boys in the seventh and eighth grades was most successful. So far the printing equipment has cost $1,500. It is being paid for entirely by pupils from work done in the print shop for parent-teachers' associations, posters and programs for the high school, and occasionally printing the "Johnstown School News," a paper issued weekly by pupils of the elementary schools. The print shop also does considerable work for the school board. The biggest single job it has done was to print 1,350 copies of a little primer of ninety pages written by Anna McGlade, a Johnstown school principal. The total value of the work of the print shop last year was $767.



TRAINING FURNITURE.
High School. Mr. W. C. Suft, Superintendent of Schools.

PROBLEMS AND PROJECTS

The Department of Problems and Projects, which is a regular feature of the INDUSTRIAL-ARTS MAGAZINE, aims to present each month a wide variety of class and shop projects in the Industrial Arts.

Readers are invited to submit successful problems and projects.

A brief description of constructed problems, not exceeding 250 words in length, should be accompanied by a good working drawing and a good photograph. The originals of the problems in drawing, design, etc., should be sent.

Problems in benchwork, machine shop practice, turning, patternmaking, sewing, millinery, forging, cooking, jewelry, bookbinding, basketry, pottery, leather work, cement work, foundry work, and other lines of industrial-arts work are eligible for consideration.

The monthly award of a prize has been suspended for the months of August and September.

Drawings and manuscripts should be mailed flat and should be addressed:

The Editors, INDUSTRIAL-ARTS MAGAZINE, Milwaukee, Wis.

A PROBLEM IN PERIOD FURNITURE.

Burl N. Osburn, Madison, Wis.

The William and Mary stool presents a problem for the boy who has tired of the Mission type of furniture and desires to attempt other period styles.

Saw the edges of the side and end rails on the band saw, being careful to keep intersections of lines sharp and not rounded. The legs may be made by squaring up the stock to $1\frac{3}{4}$x$1\frac{3}{4}$″ and gluing on the blocks for the "cabriole" part of the leg before turning; or, they may be made as indicated by turning a half-inch dowel on both ends of the center portion of the leg. In this case, the lower part, including the square which holds the under-framing, is turned separately.

Note that the end pieces of the under-framing set into the squares on the legs, while the long pieces fit into these ends.

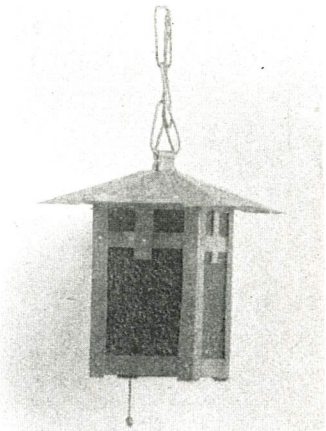
The stool should be stained either Jacobean or fumed, given several coats of hot oil well rubbed, or a coat of shellac and waxed.

A leather insert is made on pine and slipped into the top, resting on the cleats about the sides. The leather should be smooth and well filled. It should not project over $\frac{3}{8}$″ or $\frac{1}{2}$″ above the rails of the stool.

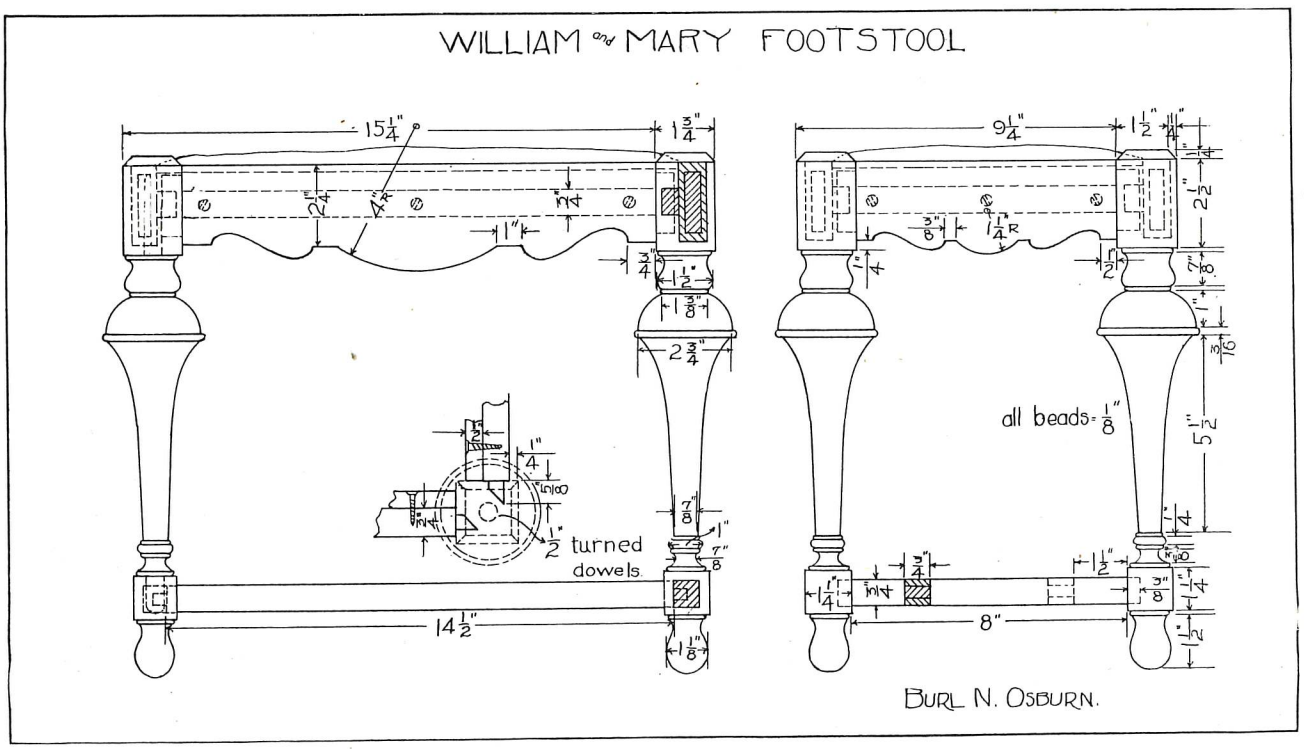
A HALL LANTERN.

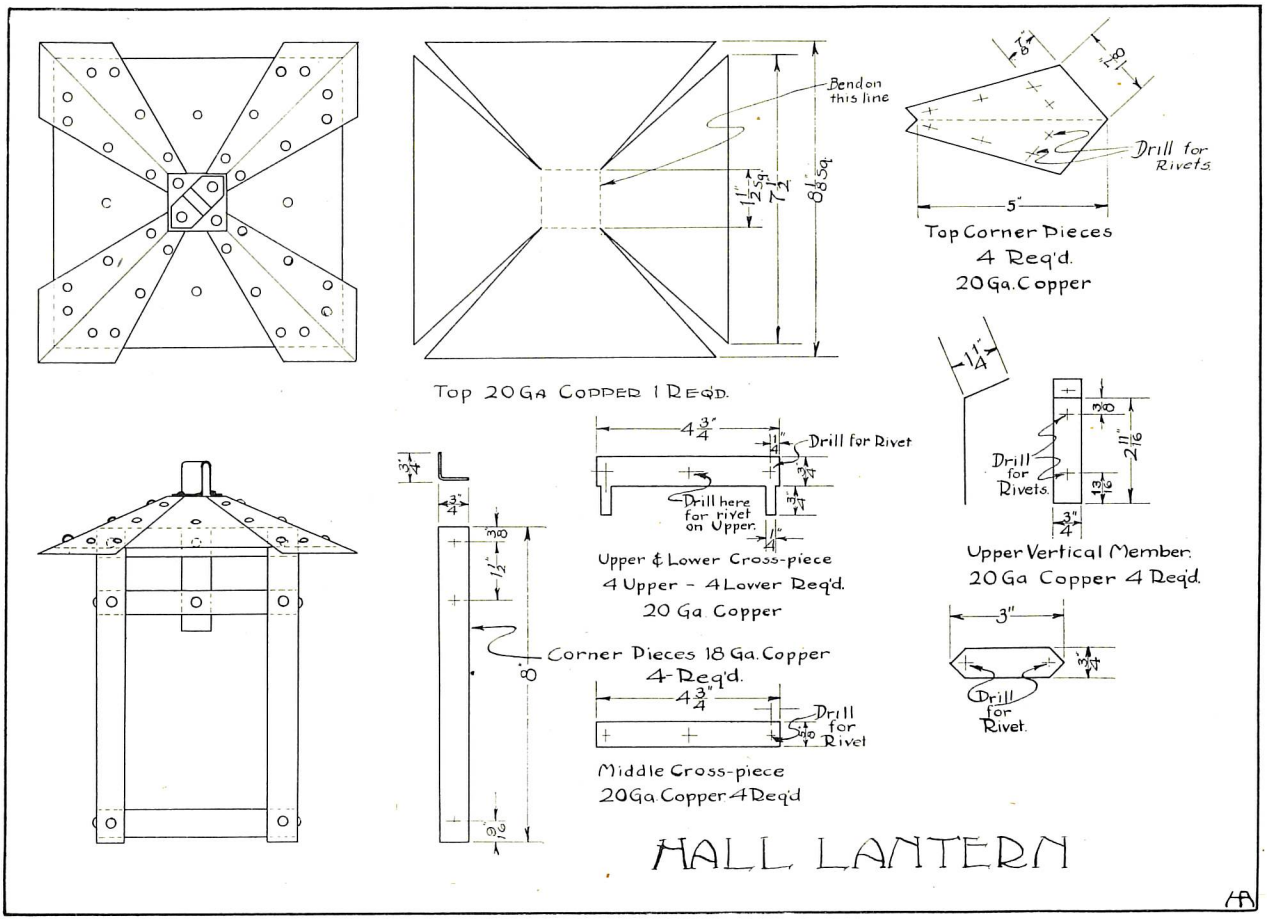
Harry W. Anderson, High School, Vinton, Ia.

The hall lantern resolves itself into two distinct units: the frame and the top. The frame is built up first. For the corner pieces take a piece of 18-gauge copper $6\frac{3}{4}$″ by 8″ and with the ball end of a hammer, hammer mark the piece. When it has been hammer-marked sufficiently anneal it as follows: Heat it with a blow torch until it is a dull cherry red and cool it by thrusting it into cold water. Cut this piece into strips $1\frac{5}{8}$″ by 8″ and mark a line $\frac{3}{4}$″ from one edge. With this edge between two blocks and the line coinciding with the arris of the blocks, clamp the whole in the vise. Now with a rawhide or wood mallet pound and bend the piece until it is bent over onto the edge of one block to a right angle. The holes for the rivets should then be laid out and drilled as given in the drawing.



The cross pieces and other members of the frame are cut and drilled according to the drawing. The little lugs on the cross pieces are to be bent over the glass to hold it in place. Assemble each of two sides of the frame separately. The rivet heads are on the inside. By holding the pieces so the rivet heads come on a flat part of the riveting block the heads will be flattened out flush with the inside of the frame so that the glass may lie close against the frame. When the two sides have been assembled rivet the remaining cross pieces and upper frame members in place. The little lugs on the upper cross pieces will necessarily have to be bent over before the top is fastened on, so put a piece of glass in place temporarily and bend all the lugs on the upper cross pieces over as they are to be.





For the top a piece of copper is cut and bent according to the dimensions and shape given in the drawing. Fill the slit so a close fit will result. For the top corner pieces take a piece of copper sufficiently large to make four and hammer-mark it thoroly. Turn the piece over and pound it flat, and then anneal it. For cutting duplicate parts like this it is best to use a paper pattern and mark around it. Cut these pieces and file the edges, using emery cloth to make the edges smooth. Lay out and drill the rivet holes. Bend these corner pieces to fit the top. Then put these pieces in place, one at a time, on the top piece and drill the rivet holes in the top piece proper. Rivet the corner pieces on and the top is ready to be drilled for the chain fixture and for the electric wires.

The chain fixture is cut, bent and drilled according to the drawing but is not riveted in place until the chain has been made. Each link in the chain is made of a piece of heavy gauge copper wire 6″ long The link at the lower end of the chain which fits into the chain fixture is bent in the shape of a triangle, the base of the triangle being about $1\frac{1}{4}$″ long and the joint occuring in the base of the link. The links are bent as follows: Put a $\frac{1}{2}$″ steel rod in the vise and bend the links around it by pounding with a mallet. File the ends of the wire so they will fit closely and form a good joint when soldered. The links should be soldered with silver solder, using borax as a flux. When the chain is completed the lower link can be put in the chain fixture and the latter riveted to the top.

The last step in assembling the lantern is now to rivet the frame and top together. Turn the top over on the bench and place the frame on it as it is to be and scribe the points where the holes are to be drilled for the rivets. To accomplish the riveting clamp a long square steel rod in the vise so the upper end is at least 10″ above the vise. By placing the frame and top over this it will be possible to rivet the two together. Clean the whole lantern with a damp rag and powdered pumice stone.

The glass for the lantern should be art glass to suit the individual taste. An ordinary socket, plug and bronze-colored drop cord with a light bulb of the desired candle-power will serve as electric equipment.

Bill of Material.

1 Pc. 18 Ga. Copper—$6\frac{3}{4}$″x8″—Corner pieces.
1 Pc. 20 Ga. Copper—Top.
1 Pc. 20 Ga. Copper—6″x11″—Top corner pieces.
1 Pc. 20 Ga. Copper—6″x10″—Cross pieces.
Wire for links, Ga. Copper.
70 Rivets—3-32″x$\frac{1}{4}$″ Copper.
1 Set Electrical wiring fixtures—Wire, plug, socket, bulb.
4 Pcs. Glass $4\frac{5}{8}$″x$7\frac{3}{4}$″.

Tools Required.

1 Ball pein hammer.
1 Riveting block.
1 Tinner's snips.
1 Hand drill and No. 13 drill.
1 Blow torch.
1 $\frac{1}{2}$″ Steel rod about 8″ to 10″ long.
1 Square steel rod from $\frac{1}{2}$″ to 1″ sq. about 16″ long.
1 Rivet header.

A TEMPLATE FOR ELEMENTARY PROBLEMS.

Hugh M. McClure, Keokuk, Ia.

One of our seventh-grade problems was a paper rack as shown in the working drawing.

The tapered piece for the spring was made of hardwood and required a discouraging amount of manual labor for a small boy. We, therefore, got these pieces out in the rough on the saw table by using the template as shown in illustration. Fig. 2.

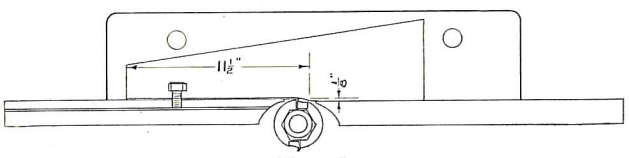


Figure I.

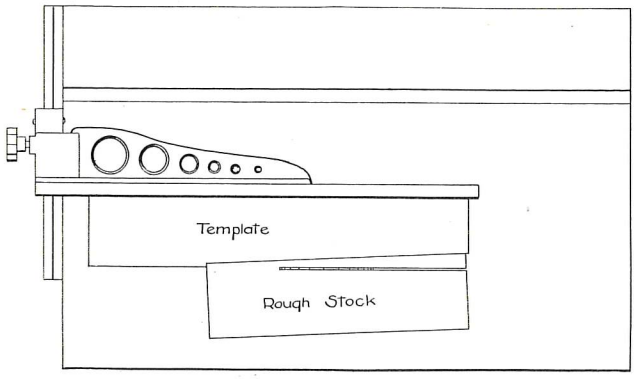
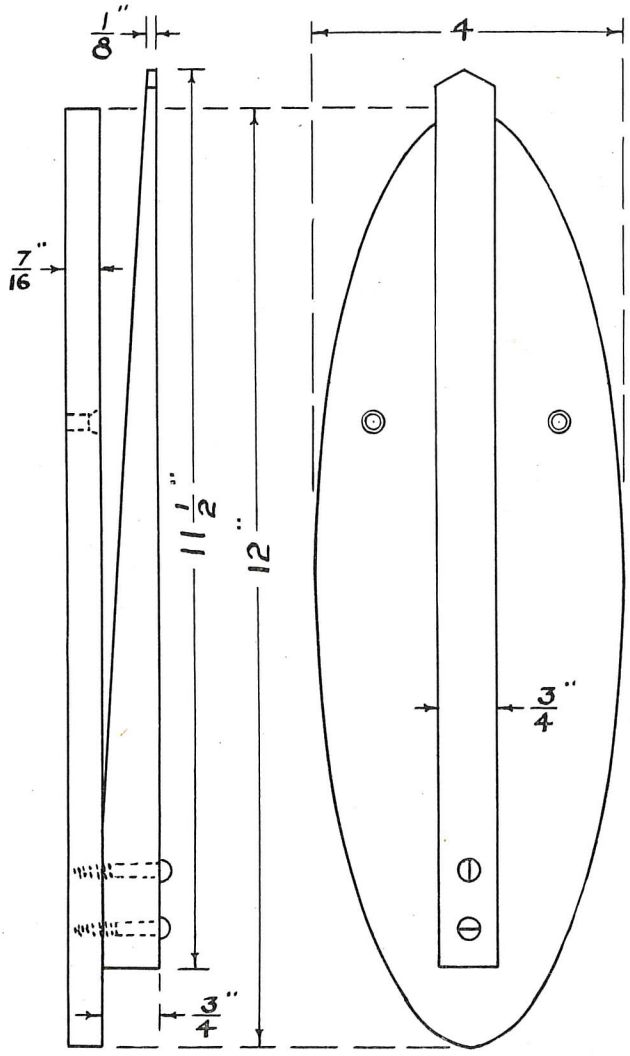


Figure 2.

The template is made by first planing it to the proper taper, (it may be any convenient width and length), and then running one side over the jointer, set at the same depth as the thickness of the smaller end of the required tapering piece but stopping the jointer cut at the length of the required piece. Fig. 1. The round corner is now removed and the



Paper Holder.

rough stock placed in the recess and fed thru the saw. By reversing the stock each time it is fed thru there will be no waste.

This method of tapering is applicable in many other instances, to table legs, etc.

SEED CORN CURING FRAME.

Louis M. Roehl.

Material Required.

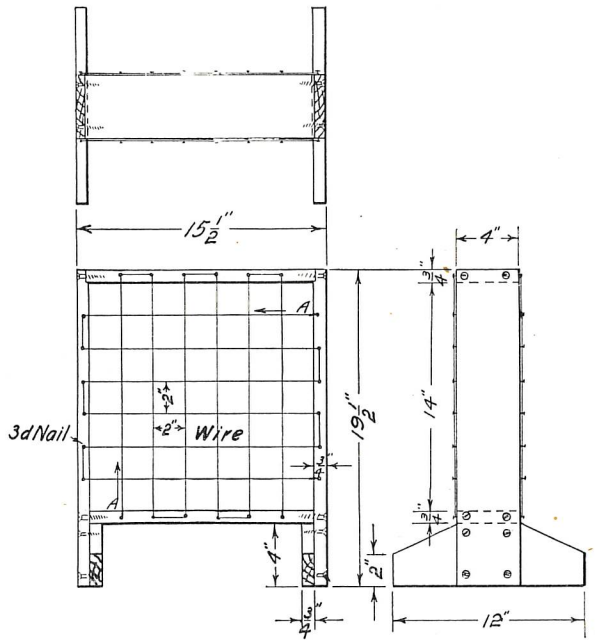
Lumber— 1 piece 1″x4″x8′ 0″ any soft wood.
Hardware—8 flat head bright wood screws $1\frac{1}{4}$″ No. 7.
8 flat head bright wood screws $1\frac{3}{4}$″ No. 10.
30 ft. of No. 18 annealed wire.
48 3d fine shingle nails.

Stock Bill.

Pieces	Finished Dimensions	Use
2	$\frac{3}{4}$″x4″x12″	Feet
2	$\frac{3}{4}$″x4″x19$\frac{1}{2}$″	Uprights
1	$\frac{3}{4}$″x4″x14″	Lower cross piece
1	$\frac{3}{4}$″x4″x14$\frac{1}{2}$″	Upper cross piece

Directions.

This frame may be made larger to suit larger quantities of corn by merely adding to the length of uprights, cross pieces and wire.



Seed Corn Curing Frame.

1. Reduce all pieces to finished dimensions.

2. To lay out feet draw a line across both ends of stock 2″ from the lower edge and two lines across top edge 4″ from either end. Connect lines on end with those on edge with straight lines and remove stock with saw and plane.

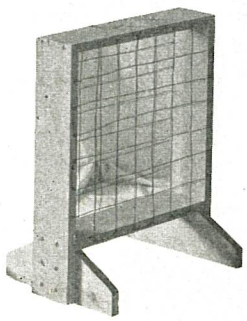
3. Cut a gain $\frac{1}{8}$″ deep x $\frac{3}{4}$″ wide on one side of each upright at the upper end for upper cross piece.

4. Fasten uprights to feet by placing four $1\frac{1}{4}$″ No. 7 screws as shown in end view.

5. Fasten cross pieces by placing two $1\frac{3}{4}$″ No. 10 screws in each end of each piece.

6. Place the 3d fine shingle nails 2″ apart as shown in drawing.

7. Use the pliers in drawing the wire taut, beginning at A and drawing in direction of arrow points.



Seed Corn Curing Frame.

NOW, ARE THERE ANY QUESTIONS?

This department is intended for the convenience of subscribers who may have problems which trouble them. The editors will reply to questions, which they feel they can answer, and to other questions they will obtain replies from persons who are competent to answer. Letters must invariably be signed with full name of inquirer. All questions are numbered in the order of their receipt. If an answer is desired by mail, a stamped envelope should be enclosed. The privilege of printing any question and reply is reserved. Address, Industrial-Arts Magazine, Milwaukee, Wis

Storing Lumber.

374. Q.—I wish to ask you to furnish me some information on finishing furniture. Our climate is very "wet" the year round, about the same as that of the coast of the Northwest. After we have dried our lumber in the kiln and made it up sometimes it will buckle and then shrink again especially when it is kept in a steam heated room. The summer time when no fire is needed the timber seems to absorb much moisture from the air—hence the trouble. —*V. D. P.*

A.—I would suggest to this correspondent that he take steps to obtain lumber properly dried. If he will look in the advertising section of the "Furniture Manufacturer and Artisan" or "The Hard Wood Record," he will find classified advertisements which have been inserted by firms whose entire business is confined to the needs of the manual training lumber trade. This material is of the highest quality, accurately milled and of the correct dry point. It is to be recommended to all manual training instructors who face the problem of inadequate and indifferent local supply. It is to be regretted that local lumber men in small towns have taken little more than superficial means to dry their lumber; to them the dry kiln in the majority of cases means little more than a large room heated with exhaust steam, where the lumber is piled with little or no regard to proper sticking, so that the material comes from the kiln case hardened, full of checks and badly warped. Genuine kiln drying of lumber is an exacting process, and because of this fact the local and small dealer avoids the issue wherever possible. If your correspondent faces this problem, I would recommend that he present this matter to his superintendent in the way in which I have approached the subject. I would suggest that he at least correspond with the advertising firms and get prices on the basis of guaranteed stock for each kind and grade desired. With this information at hand, he should be able to force the local dealer to take steps to improve upon the quality of his lumber. I would further suggest to your correspondent that he secure as well lighted and ventilated a room as the circumstances will permit. According to the number of kinds of lumber which he will handle, it will be of an advantage to this manual training teacher to build saw horses of 2″x4″ material, 2′ high and 36″ long and of such a number as to space them four feet apart under any given length of wood. This length of saw horse will accommodate the common sizes of 6″, 8″ and 12″ material. On receipt of the lumber each width and length should be stacked on these horses in their individual piles, taking care to place 1″x1½″ stickers every 2′ along the board to insure that the boards in the pile receive sufficient air. Care should be exercised at all times to ascertain that these stickers are directly one above the other thru the pile of material, otherwise a crooked board will result from pressure of the overlying lumber. This method will enable the instructor to have his material conveniently sorted as to kind and size of lumber and insure a minimum loss from poor ventilation and improper piling. —*Ralph G. Waring.*

Finished Motor Parts.

468. Q.—We are contemplating a course in armature winding and motor work for a special class this year. Could you please tell me where I can obtain the finished parts exclusive of the winding for a number of ¼ H. P., 110 volt, 60 cycle, alternating current motors? The motors may be of the squirrel cage or repulsion type.—*P. G. A.*

A.—General Electric Company, Schnectady, N. Y.; Northwestern Manufacturing Company, Milwaukee, Wis.; Kimble Electric Company, 634 North Western Ave., Chicago, Ill.; The Westinghouse Electric & Manufacturing Company, West Pittsburgh, Pa.; Holtzer-Cabot Electric Co., 6161 South State St., Chicago, Ill.

Jewelers' Tools.

475. Q.—Will you please give me the name, etc., of some manufacturers of jewelry craft workers' tools and supplies? —*A. R.*

A.—The following manufacturers can supply your wants: F. W. Gesswein Company, 16 John Street, New York, N. Y.; Wm. Dixon, Inc., 39 John Street, New York, N. Y.; Briggs-Weaver Machinery Co., Dallas, Tex.; Pacific Gem Company, 622 S. Broadway, Los Angeles, Cal.; Belcher & Loomis, 89 Weybosset St., Providence, R. I.; Oshkosh Mfg. Company, Oshosh, Wis.

Magazines on Furniture Making.

476. Q.—Give names of publishers publishing magazines on furniture manufacturing, cabinet-making, etc.—*E. H. K.*

A.—Furniture Manufacturer and Artisan, Grand Rapids, Mich. (Subscription price, $1.00); Good Furniture, Grand Rapids, Mich. ($3.00); American Cabinet-Maker and Upholsterer, New York City ($1.50); The Craftsman, New York City ($3.00); Veneers, Indianapolis, Ind. ($1.00).

Books on Pattern-Making.

478. Q.—Name book or books which you feel would teach pattern-making from elementary thru a quite advanced stage.—*E. H. K.*

A.—*The Art of Pattern-making.* By C. I. McKim, Manual Arts Press, Peoria, Ill.; *Problems in Pattern-making.* By F. D. Crawshaw, $1, Manual Arts Press, Peoria, Ill.; *Wood Pattern-making.* By H. T. Purfield, $1.25, Manual Arts Press, Peoria, Ill.; *Pattern-making.* By G. H. Willard, $1, Manual Arts Press, Peoria, Ill.; *The Principles of Pattern-making.* B. J. G. Horner, $0.75, Whittaker & Co., London, Eng.; *The Art of Pattern-making.* By I. M. Chase, $2.50, John Wiley & Sons, New York City; *Pattern-making.* By J. Ritchey, $1, Am. School of Correspondence, Chicago, Ill.; *Wood Pattern-making.* By Turner and Town, Manual Arts Press, Peoria, Ill.; *Practical Pattern-making.* By F. W. Barrows, $2, N. W. Henley Co., New York City.

Books on Art Metal and Jewelry Work.

479. Q.—Name a book on art metal work and jewelry work (hand wrought) which you feel would teach these subjects from elementary thru a quite advanced stage.—*E. H. K.*

A.—*Copper Work.* By A. F. Rose, $1.50, Atkinson, Mentzer & Co., Chicago, Ill.; *Art Metal Work and Jewelry.* By L. J. Haas, $1, Sequoyah Publishing Co., Oswego, N. Y.; *Hand Wrought Jewelry.* By H. R. Sorensen and S. J. Vaughn, $1, net, The Bruce Publishing Co., Milwaukee, Wis.—*H.*

Books on Wood Finishing.

480. Q.—Name a book covering a very broad field of wood finishing.—*E. H. K.*

A.—See page 468, October number.

Refinishing a Walnut Table.

483. Q.—I would like to know how to refinish an old-fashioned, drop-leaf walnut table. The top has had rather hard usage but I want to use it without a table cloth.—*M. L.*

A.—Would suggest that you completely dissemble the table, by removing the hinges from the drop leaves and using some system of marking to be sure that adjacent parts are returned to their proper places on reassembling. With the table taken apart as far as practicable, carefully test the joints in the top of the legs to be sure that the glue is in good condition.

If such is not the case, carefully knock the frame apart and glue it together again, being sure to scrape all old glue from the mortises and tenons. Would suggest also that previous to gluing the frame together, in case this is necessary, that you take the legs singly and clamping the square end in a vise, scrape and sandpaper or otherwise remove all of the

old finish. When these have been thoroly cleaned ready for the new finish, proceed to glue them together.

Next, take the top boards. In case there are any bad holes which cannot be removed by planing, a method to be recommended in this case, it will be necessary to level these holes off by melting in a brown shellac which can be bought in stick form in the paint shops for the purpose, carefully sanding and scraping the shellac to a surface level with that of the wood.

Now proceed to use No. ½ sandpaper and a sanding block, and by rubbing with the grain of the wood, carefully sand the piece to a surface free from scratches and other imperfections. Care should be exercised to see that the edges of the table are cleaned at the same time. When the wood has been thoroly sandpapered ready for the finish, sponge it quickly with cold water to raise the grain. This will open the pores and prepare them for the stain coat. Let the wood dry over night and carefully smooth down again with No. 0 sandpaper. Dust carefully before staining and then apply a full, heavy coat of the following solution, preferably hot:

Into one gallon of hot water, dissove one ounce each of potassium permanganate and one ounce of epsom salts. Let the stain dry over night. In case this water stain cannot be made, the following formula will produce a very fine oil stain: Cut asphaltum varnish with turpentine and benzol, equal parts, then add a solution of oil black (one part to ten of turpentine) until the depth of shade required is obtained. When the stain has thoroly dried, give a coat of orange shellac, reduced one-half with alcohol, and when thoroly hardened sand perfectly smooth with No. 00 sandpaper. Make up a filler to a good rich brown, brush on across the grain and when it begins to set or lose its shine, remove the surplus by rubbing across the grain with a piece of clean burlap. Pick out all filler from corners or carving with a pointed stick. If this filler cannot be obtained already prepared in the paint shop, it may be made by using the following formula: Twelve parts of pure boiled oil, 6 parts Japan drier, 1 part turpentine. To this add all of the ground silex which the oil will absorb to make a very stiff dough. Let stand over night and on thoroly stirring in any oil which has raised to the top, remove enough to form the base of the reduced filler sufficient to do the work. In this case about a pound will be enough.

Reduce the paste filler with gasoline or turpentine to the consistency of milk, and proceed to darken with raw and burnt sienna and umber and drop black in oil until a rich brown shade is obtained. Apply as directed above, being sure that no surplus remains on the surface of the wood as it becomes rock hard and is very difficult to remove. Let dry 48 hours, go over the surface carefully with a piece of No. 00 sandpaper to be sure that it is perfectly smooth, dust carefully and varnish in four or more coats of varnish, allowing a week between coats. When each coat is thoroly dry, it should be rubbed with No. 0 pumice stone, felt pad and water until the surface is perfectly smooth and free from any scratches or any other imperfections. The last coat may be polished with rotten stone and water and when dried off with a chamois or cheese cloth, cleaned up with a good oil polish.—*Ralph G. Waring.*

NEW BOOKS AND PAMPHLETS

Costume Design and Home Planning.

By Estelle Peel Izor; illustrated by Katherine Porter Brown and Rachel Taft Dixon. Published by Atkinson, Metzer and Company, Boston, New York, Chicago, Dallas.

This book is a splendid statement of the application of principles of art to costume and home design. The chapter subjects are significant of the text: Good spacing of Striped Materials. Tucks and Hem. Plaids. Suitability of Line to Figure. Aprons. Rhythm in Laces and Embroidery. Color Theory in Dress. Color and Complexion. Structural Lines in Waists Appropriateness. Design in Dress.

The chapters on Home Planning give suggestions for the choice of a site and plan for a tasteful home with instructions on the selection of finish and furnishing. The text is beautifully illustrated with color and half tone plates.

How Children Learn to Draw.

By Walter Sargent and Elizabeth E. Miller. Price, $1.00. Published by Ginn and Company, Boston.

This book is a clear, well illustrated statement of the methods and the results of instruction in the Elementary School of the School of Education of the University of Chicago. From these results certain conclusions are drawn of first importance to drawing teachers. Such prolonged experiments will do much to clear vague theories and establish effective methods in the teaching of drawing.

The book should be read carefully by every teacher of drawing in the grade schools.

Concrete in the Farm and in the Shop.

By H. Colin Campbell. Limp cloth, 149 pages Price, $0.75. N. W. Henley Co., New York.

This little book is a very complete untechnical manual on concrete construction for the farm and the shop. It is especially well adapted to school use because of its simplicity and completeness, and because the author has been careful to be exact in his statements of methods and definite in his recommendations

The articles which he suggests for construction are especially well suited for school problems. The book opens with a complete discussion of the nature of cement and concrete, principles of mixing, placing concrete, making of forms, concrete tools, etc. It describes in detail principles of reinforcing, the building of foundations, walls, fences, posts, tanks and troughs, floors and walks, and miscellaneous articles.

The book ought to be in the library of every manual training department.

Clothing for Women.

By Laura I. Baldt. 454 pages. Price, $2, net. J. B. Lippincott Co., Philadelphia, Pa.

While this book is chiefly designed for the mature woman, it will be found valuable as a textbook and as a reference book for trade and high school classes in dressmaking.

The book opens with a discussion of clothing budgets and buying of clothing, fabrics, prices of clothing, design and color. In sequence, it takes up patternmaking, processes involved in the construction of garments, construction of undergarments, construction of outer garments and the decoration of garments. A final chapter contains suggestions to teachers.

The book has been developed as a result of many years of experience in teaching high school classes and college classes. The author is perhaps more full and clear in her treatment of the subject than might be demanded by an ordinary textbook so that the work can be used without the assistance of teacher by the average home dressmaker. The illustrations, which are very complete, are unusually clear and well printed.

Seventy-two Useful Lumber and Price Tables.

By L. H. Alberty, Winfield, Kansas. Price, $1.

This book gives in a series of tables the number of board feet in sizes from one inch by one inch up to sixteen inches by twelve feet; also gives the price of each piece in any priced lumber less than twenty-one cents a board foot.

To teachers who must compute the price of small pieces of boards of differing sizes every day, this little book will be a great aid.

Mechanical Drawing for Secondary Schools.

By Crawshaw and Phillips. 332 pages. Price, $1. Scott, Foresman Company, Chicago, Ill.

The authors of this textbook have had many years of experience in teaching drawing and both are considered to be authorities in this field. Mr. Crawshaw is professor of Manual Arts in the University of Wisconsin and Mr. Phillips